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THE NATIONAL CYCLOPÆDIA

OF

USEFUL KNOWLEDGE.

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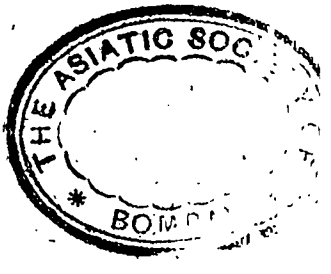
VOL. IX.

NORTH-WESTERN TERRITORY——QUOTIENT.



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THE

NATIONAL CYCLOPÆDIA

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NORTH-WESTERN TERRITORY is a term frequently used to denote a part of the territory which lies to the west of the Chippewyan or Rocky Mountains, in North America.

The Rocky Mountains run from the mountain-knot of the Sierra Verde (between 40° and 42° N. lat.), in a general north-north-western direction, through 25° of longitude (from 110° to 135° W. long.), until they terminate at the mouth of the Mackenzie River. (68° N. lat.) The most eastern range of this extensive mountain-system constitutes the eastern boundary of the region in question. The shores of the Pacific, which bound it on the west, run (between 40° and 45° N. lat.) nearly due north, and gradually approach the mountains. The distance between them varies from about 400 to 700 miles, except in the peninsula near Behring's Strait, where it is much greater. The total area is estimated at 1,100,000 square miles.

The Southern Region, which extends from 40° to 47° N. lat., is traversed by two or three parallel ranges of mountains, some of the summits of which reach a height of 15,000 feet. The rivers descend very rapidly to the Pacific; and the valleys vary greatly in character, according to the circumstances of their position.

The Central Region, which extends along the coast from the Sound of Juan de Fuca to Behring's Bay, is but little known. Though the Hudson's Bay Company has of late years formed several establishments in the interior, and particularly south of 55° N. lat., we possess little information respecting its natural capabilities. The Chippewyan Mountains continue to form two ranges, about 100 miles from one another. The eastern range, south of 55°, is by far the more elevated, and contains many snow-capped summits, among which Mount Brown rises to nearly 16,000 feet. The Peace River, Slave River, Columbia River, Mackenzie River, and Turnagain River, have their sources among these mountains. The country, which begins at the base of the western range of the Chippewyan Mountains, and extends westward for about 80 miles from the sea, occupying on an average a width of more than 100 miles, may be considered as an uneven plain. A considerable portion of this plain is covered with swamps and lakes; but the vegetation is very luxuriant. Along the coast of the Pacific the country is mountainous, and occupies a width of probably 80 miles. Between the mouth of Fraser River and Smith Inlet, a distance of more than 200 miles, it appears to constitute one uninterrupted mass of high mountains, the declivities of which extend to the shores of Queen Charlotte Sound, which separates the large island of Quadra and Vancouver from the continent. The islands which skirt this coast partake strongly of the natural features of the adjacent continent. They consist of high mountains, which for the greater part of the year are covered with snow; their shores are rocky and high; and they are only partially covered with forest trees. Among these islands are Vancouver, Aristizabali, Prince Royal, Banks, Revillagigedo, and Queen Charlotte Island. King George III.'s Archipelago is farther north.

The Northern Region, or the large peninsula which stretches between 60° and 70° N. lat., from 130° W. long. between the Pacific and the Polar Sea, and terminates at about 166° W. long. on the shores of Behring's Strait and the sea of Kamtchatka, is the least known portion of the north-western coast of America. It is only the shores and their immediate vicinity which have been visited, and up to the year 1837 a part of the coast along the Polar Sea had never been seen by any European. Not far from Behring's Bay rises the high summit called Mount St. Elias, which is considered to be the highest mountain in North America, being 17,144 feet above the sea-level. There are many inlets along the coast, among which the largest are Prince William's Sound and Cook's Inlet, which inclose the elevated rocky peninsula of Tchougatchi. At the point where the peninsula of Aliaska is connected with the continent is the island of Kodiak, which is above 100 miles long, and on an average 50 miles wide; it consists of rocky mountains of moderate elevation, with fine valleys between them. The peninsula of Aliaska and the chain of volcanic islands which stretch from the extreme western point of the peninsula nearly to the shores of Kamtchatka, separate the sea of Kamtchatka from the Pacific. Point Barrow, the most northern point of America on this side, is a long low spit, composed of gravel and loose sand, which

the pressure of the ice has forced up into numerous masses, which at a distance appear like rocks. It projects several miles into the Polar Sea. From this point eastward to the mouth of Mackenzie River the coast declines a little to the south of east.

The countries described under this head are claimed by three powers—the United States of America, the British, and the Russians. The claims of the Russians and the British have been settled by treaties, according to which the whole of the northern peninsula west of 141° W. long. belongs to the Russians, as likewise a tract along the coast as far south as 56° N. lat., and the greater part of the islands forming King George III.'s Archipelago. In 1799 a Company was incorporated under the name of the Russian American Company, for the purpose of trading along the north-western coast, and of hunting the fur-bearing animals, especially the sea-otters. Their chief settlements are at New Arkhangelsk, Nushagak, and Alexandria. The district of OREGON forms part of this region. All the portion between the Russian and United States territories are claimed by the British.

NORTH, SIR THOMAS, Knight. We regret that we have been unable to obtain any materials for a biographical notice of Sir Thomas North, the first translator of the lives of Plutarch into English. North had previously published two other works:—1, 'The Diall of Princes; compiled by the Reverend Father in God, Don Anthony of Guevara, and Englyshed out of the Frenche; right necessary and pleasaunt to all Gentlemen and others which are lovers of Vertue,' London, 1557, folio; 1568, folio; 1582, 4to. 2, 'The Morall Philosophie of Doni, drawne out of the auncient Writers; a work first compiled in the Indian Tongue, and afterwards reduced into divers other Languages; and now lastly Englyshed out of the Italian,' London, 1570, 4to.

North's translation of Plutarch was made, as he states in the title, from the French version of Amyot, which however he has not always exactly followed. His dedication to Queen Elizabeth is dated Jan. 6, 1579; his address to the Reader, Jan. 24, 1579. The book contains various other lives in addition to Plutarch's.

NORTH, FRANCIS, BARON GUILFORD, the immediate elder brother of Sir Dudley North, was born Oct. 22, 1637. He acquired the rudiments of education at a school at Isleworth. In 1653 he was admitted fellow commoner of St. John's College, Cambridge. He afterwards became a member of the Middle Temple. His practice at the bar was for some time insufficient to satisfy his expectations, and he had sunk into despondency when he was patronised by Sir Jeffery Palmer, the attorney-general. He then went on the Norfolk circuit. In the memoir of the lord keeper by his brother, Roger North, we are let into all the hopes and fears of this young aspirant—his paltry and dishonest tricks, his intense selfishness, his moral cowardice, his trimming politics, and his readiness to do any work that persons well intrenched in power might set before him. He gained favour with the Crown by pleading against the privileges of parliament, and was rewarded with a silk gown. In 1671 he was made solicitor-general; and on the promotion of Sir Heneage Finch to the woolsack, he succeeded him as attorney-general in 1673. In 1675 he was made lord chief justice of the Common Pleas. The King's Bench at this time had engrossed so much business by the fictitious use of the writ of 'latitat,' that 'the proper court sat idle.' North retaliated by a dexterous use of the 'capias,' and we are told that 'after this process came into common use, it is scarce to be conceived how the court revived and flourished.'

On the death of Lord Nottingham in 1682, the great seal was confided to North's keeping. But he refused to touch the seals until, 'for his majesty's honour,' they were accompanied by a pension of 2000*l.* a year. He died Sept. 5, 1685.

NORTH, SIR DUDLEY, the third son of Dudley, Lord North, Baron of Kelting, was born May 16, 1641. He made little progress in literary education, but 'had a strange bent to traffic.' Being bound to a Turkey merchant, he was sent as supercargo to Archangel and Smyrna. He left an animated and curious journal of his voyage to Archangel, and his subsequent progress by Italy to Smyrna, published by his brother and biographer.

He spent his latter years in London. He was chosen sheriff, and knighted, and was afterwards elected alderman of Basinghall, and made a Commissioner of Customs. Towards the end of the reign of Charles II. he was made a Commissioner of the Treasury, but on the accession of James II. he was sent back to his office in the Customs. He made himself somewhat unpopular in his office by suggesting a tax on sugar and tobacco. In the mean time he had been chosen member of parliament for Banbury. He lost his office at the Revolution, and was subjected to a pretty rigorous examination by both Houses of Parliament. He died Dec. 31, 1691.

NORTH, ROGER, the sixth son of Dudley, Lord North, was born about 1650. He studied in the Middle Temple, and became steward of the courts to Archbishop Sheldon. It is stated that he was Attorney-General to James II., but his name does not appear in the list of attorney-generals in Beatson's 'Political Index.' He died in 1733. He left, in manuscript, some 'Memoirs of Music.' In 1740, a quarto volume was published called 'Examen, or an Enquiry into the Credit and Veracity of a pretended complete History, showing the perverse and wicked design of it, and the many Falsities and Abuses of Truth contained in it, together with some Memoirs occasionally inserted, all tending to vindicate the Honour of the late King, Charles II., and his happy Reign, from the intended Aspersions of that foul Pen.'

The work by which Roger North is now best known was the 'Lives' of Lord Keeper North and of his brothers Dudley and John, published after his death—1740-1742, in 2 vols. 4to. The work was re-edited in 1826.

NORTH, FREDERIC, EARL OF GUILFORD, better known by the title of *Lord North*, was born April 13, 1733. He was educated at Eton, and at Trinity College, Oxford. In 1763

Lord North was appointed one of the lords of the treasury. Two years afterwards, on the formation of Lord Chatham's ministry, Lord North received the office of joint-paymaster of the forces in conjunction with Mr. Cooke. He became chancellor of the exchequer in 1769, and at the same time leader of the House of Commons, on Charles Townshend's unexpected death. In 1770 he became first lord of the treasury, still holding the chancellorship of the exchequer.

Lord North's ministry lasted from 1770 to 1782. Being defeated Feb. 22, 1782, in the House of Commons, on the question of the continuance of the American war, he gave way to Lord Rockingham. That war is the chief characteristic of his ministry. Lord North maintained both its justice and its expediency. But it is now understood that he disapproved of the continuance of the war for at least three years before his resignation, but continued it only in deference to the wishes of George III. The Rockingham ministry, which succeeded Lord North's, was soon followed by an administration under Lord Shelburne, which placed Lord North by the side of Mr. Fox, in opposition. In a short time arose the well-known and much-abused coalition. [Fox.] In April, 1783, a ministry was formed by the Duke of Portland, in which Lord North and Fox were appointed secretaries of state. This ministry ended its career in December of the same year.

When Lord North retired from the premiership in 1782, he had been appointed Lord Warden of the Cinque Ports. He succeeded to the title of Earl of Guilford on the death of his father in 1790. Two years afterwards he died, in the 60th year of his age. During the last 5 years of his life he was afflicted with blindness.

NORTHALLERTON. [YORKSHIRE.]

NORTHAMPTON. [NORTHAMPTONSHIRE.]

NORTHAMPTONSHIRE, an inland county of England, is bounded N. by Lincolnshire, N.W. by Rutlandshire and Leicestershire, W. by Warwickshire, S.W. and S. by Oxfordshire, S.E. by Buckinghamshire and Bedfordshire, and E. by Huntingdonshire and Cambridgeshire. Its greatest length N.E. to S.W. is 69 miles; its greatest breadth N.W. to S.E. is 27 miles. The area is 1016 square miles. The population in 1841 was 119,228.

Surface and Rivers.—The surface of the county is undulating; the hills do not rise to a great height, but present gentle declivities separated by intervening vales watered by rivers and rivulets, and so irregularly grouped as not to admit of description. The highest land is about Daventry, where Arbury Hill rises to the height of 804 feet above the level of the sea.

The eastern border of the county is occupied by the Oxford clay, which forms the separation between the middle and lower divisions of the oolitic series. The rest of the county is chiefly occupied by the uppermost formations of the lowest division of oolites. Slaty beds of the Forest marble, lime, and brick clay, occur in various places.

The greater part of the county belongs to the basin of the Nene, which is the principal river in it. A small portion of the north and north-west borders belongs to the basin of the Welland; another small portion, on the west side, to the basin of the Severn; and the southern extremity of the county, to the basins of the Ouse and the Thames. The Nene flows past Northampton, Wellingborough, Thrapston, and Oundle, to the borders of the county; receiving the Isc, Harper's Brook, and Willow Brook. The Welland is principally a boundary river, receiving but few tributaries from Northamptonshire. The streams belonging to the basin of the Severn are the Avon, which rises near Naseby, and has the upper part of its course in this county; and the Leam, which has a few miles of the upper part of its course on the border. The streams belonging to the basin of the Ouse are the Ouse and the Tow. The streams belonging to the basin of the Thames are the Cherwell, or Charwell, which rises at Charwellton, 5 miles south-west of Daventry, and some of its tributaries.

Portions of the Grand Junction Canal, Oxford Canal, and Grand Union Canal, are in this county. The London and North Western Railway, the Syston and Peterborough Railway, and the Great Northern Railway, also pass through the county.

Soil and Agriculture.—The county of Northampton has many advantages in point of climate and soil, and has for a long time been comparatively well cultivated and productive. The soil is generally adapted to produce both corn and pasture of a superior quality. A small proportion only of the surface is poor, from the thin staple of the soil, or from a cold impervious subsoil. Leaving out the natural woods, which are considerable, that which remains unproductive for want of cultivation is trifling, and could easily be improved.

The richest soil in the county is perhaps the black mould of the fens, when they have been drained and cultivated; but the most desirable for the farmer is the brown crumbling loam of the uplands. Where this is of a sufficient depth, it will produce, with little trouble, abundant crops of wheat, beans, barley, and oats, and it is peculiarly adapted to turnips and all green crops. The pastures are both rich and sound, and the cattle grazed in them in summer repay the capital laid out on them with good interest; while those which are kept on turnips in the yard, to be turned-out in summer, or are stall-fed to bring them to a marketable state, convert the straw, which is abundant, into rich manure.

The old course of husbandry was the triennial; a clean fallow, wheat, beans, and oats on the best heavy soils, and wheat, peas and barley on the lighter. The introduction of turnips and clover has changed the system, and greatly improved the produce. But where turnips are not suited to the soil, from its compact nature, the clean fallow, at least every fourth year, is still retained. On some lands barley or oats are sown after wheat. In the improved rotations the land is frequently left three years in grass, and then ploughed up again.

The permanent pastures are very good in most parts of Northamptonshire; 80,000 acres are devoted to feeding cattle.

The fattening of cattle is a principal object of the Northamptonshire farmer. Some breed their own bullocks, but this is only when they have some improved breed of their own. The breed of sheep most common in the rich pastures is the improved Leicester; and since long wool has been in request, and sells dearer, in proportion to the weight of the fleeces, than the finest short wool, scarcely any other breeds are in repute.

Divisions and Towns.—Northamptonshire is divided into 19 hundreds. It is in the diocese of Peterborough, with the exception of a small portion of the county on the S.W. border, which is in the diocese of Oxford. It is in the Midland circuit, and the assizes are held at Northampton. For parliamentary purposes the county is divided into North and South Northamptonshire. Each division returns 2 members, and 2 members are returned respectively by the boroughs of Peterborough and Northampton: total, 8 members.

The following are the principal towns, with the population of each in 1841:—

Brackley, a market-town, 18 miles S.W. from Northampton, is situated on the south bank of the Ouse, which is here a small stream crossed by a bridge of two arches. There are two churches and a town-hall. Brackley sent two members to parliament from the time of Henry VIII. till it was disfranchised by the Reform Act. Population of the united parishes, 2121, including the hamlet of Halse.

Daventry, a market-town 12 miles W. from Northampton, stands on an eminence, and consists of two principal streets and some smaller ones. The houses are generally neat and well built. The church is a modern building. Population of the parish, including the hamlet of Drayton, 4565.

Higham Ferrers, a market-town, 16 miles N.E. from Northampton by the Northampton and Peterborough branch of the North Western Railway, stands on a rocky eminence half a mile from the eastern bank of the Nene, and consists chiefly of one long street running north and south. Its elevated site renders it clean and healthy; but the houses are generally poor. It has a large and curious church, formerly collegiate. There is a town hall of modern erection. Population of the parish, 1030.

Kettering, a market-town 13 miles N.W. by N. from Northampton, is situated on the slope of a hill, at the foot of which runs a small brook, a feeder of the Ise. The market-place is spacious, and is surrounded by well-built houses and respectable shops. The church is a large and handsome building of perpendicular character. Woolstapling and wool-combing are carried on in the town; there is a considerable manufacture of shoes; and that of silk shag for hats has been also introduced. Population of the parish, 4867.

Northampton, the county town of Northamptonshire, a parliamentary borough, and municipal borough, is situated on the north bank of the Nene, 67¼ miles N.W. from London by the North-Western Railway, and 42¾ miles S.W. from Peterborough by the Northampton and Peterborough branch. There are three bridges over the two branches of the Nene within the limits of the borough. The town consists of several streets irregularly laid out; the two principal lines of street intersect at right angles. The houses are well built, chiefly of stone; and the streets are paved, and lighted with gas. The market-place is a large open area in the centre of the town. Among the principal edifices are, the shire-hall, a spacious building of elegant Grecian architecture; the county gaol; the town-hall, an ancient building; the borough gaol; the theatre; the barracks; and the infirmary. All Saints church is in the centre of the town. It is a plain building of incongruous architecture, having in the centre a cupola supported on four Ionic columns. At the west end is the original embattled tower. St. Giles's Church, near the east end of the town, is a large cross church with portions of various styles. St. Sepulchre's is on the north side of the town: it was built probably about the beginning of the 12th century, and is one of the few round churches in the kingdom.

The principal branch of trade carried on in the town is boot and shoe making. The articles are sent to London and other parts of England, or are exported. Considerable business is done in currying leather; some stockings and lace are made. There are iron foundries. The trade of the town is facilitated by the navigation of the Nene, and by the double railroad communicating with the Junction Canal. The municipal borough is divided into 3 wards, and is governed by 6 aldermen and 18 councillors: population 21,262. The parliamentary borough returns 2 members: population, 20,637.

Oundle, a market-town, is 13 miles S.W. from Peterborough by the Northampton and Peterborough branch of the North-Western Railway. The Nene nearly surrounds the town, and is crossed by two bridges. That on the north-east side of the town, over which the road to Peterborough passes, is a fine bridge of several arches; connected with it is a causeway, raised on arches, to secure a passage over the flats near the river when the waters are out. The streets are well paved and lighted, and the houses generally modern and well built. The church, which is large and handsome, has a tower and spire 200 feet high. Population of the parish, 2865.

Peterborough, a city and parliamentary borough, and the seat of the bishopric of Peterborough, is situated on the north bank of the river Nene, over which there is a wooden bridge. The streets are regularly laid out, and are well paved and lighted. At the time of the dissolution Peterborough was the site of one of the richest abbeys in the kingdom, out of which the present bishopric was formed. The cathedral and conventual buildings were much injured during the civil wars of Charles I. The cathedral is chiefly of early English architecture, with intermixture of later styles. It has double transepts, with a low central tower. Length, 476½ feet, width of the nave and aisles, 78 feet, height of the nave, 78 feet, height of the central tower, 150 feet. The Nene is navigable for boats. Population of the city, 6096; of the parliamentary borough, which returns 2 members, 6991.

Thrapston, a market-town, is 21¼ miles N.E. from Northampton by the Northampton and Peterborough branch of the North-Western Railway. The town is pleasantly situated on the east bank of the Nene, over which there is a wooden bridge. The houses are in general neat and well built. The church has a tower and spire at the west end. Population of the parish, 1131.

Towcester, a market-town 8 miles S. by W. from Northampton, is situated on the right bank of the Tow, and consists principally of one long street on the road from London to Coventry and Birmingham: this street is paved, and consists of well-built houses. The church is a neat building in the early English style. The chief trade of the place is in boots and shoes, and in lace. Population of the parish, 2749.

Weedon-Beck, 4 miles E.S.E. from Daventry, is a small place, which deserves notice on account of the Royal Military Depôt established there, consisting of extensive barracks, storehouses, hospital, and workshops. Population of the parish, 2195.

Wellingborough, a market-town, 12 miles N.E. from Northampton, is situated on an eminence just above a little brook which flows into the Nene; and from half a mile to a mile from the left bank of the Nene itself. The town was rebuilt in 1738, after a dreadful fire. It now consists of a number of streets, irregularly laid out, the principal of which meet in the market-place. The houses are for the most part built of a red sand-stone, on which rock the town stands. The church is large and handsome, and of various styles of architecture. There is a town-hall. The principal manufacture of the place is that of boots and shoes. Population of the parish, 5061. Wellingborough received its name from the wells or springs about the town.

History, Antiquities, &c.—In the earliest division of the island it is doubtful whether this county was included in the dominions of the Coritavi, the Catyeuchlani, or the Iceni. Perhaps these nations may have occupied each a portion. In the Roman division of Britain, Northampton was included in the province of Flavia Cæsariensis. Numerous indications of Roman residences or posts may be traced in various parts of the county, and the remains of fortifications are also numerous.

The county was included in the Anglo-Saxon kingdom of Mercia. Both Henry III. and Edward I. frequently resided at Northampton; and in the reigns of Edward II. and III. and Richard II. several parliaments were held here.

Of ancient ecclesiastical monastic or castellated architecture the county possesses several specimens. Brixworth church, between Northampton and Market Harborough, is one of the most remarkable.

The castellated ruins are few. These are the earth-works of Northampton, Higham Ferrers, Brackley, Fotheringhay, and one or two others, and the gateway of Rockingham.

In the reign of Queen Elizabeth this county was the scene of the execution of Mary, Queen of Scots, who was tried, condemned, and beheaded in Fotheringhay Castle. This castle was entirely demolished by order of James I. when he came to the throne. The battle of Naseby, which decided the civil war of Charles I., was fought in this county in 1645.

NORTHCOTE, JAMES, was born in 1746, at Plymouth, where his father was a watchmaker. He went to London at the age of 25, to study painting under Sir Joshua Reynolds, and was his pupil for 5 years. Soon after quitting Reynolds, he set out for Italy, where he spent about 5 years, and was made a member of the academies of Florence and Cortona. On his return he was encouraged by Boydell, for whose 'Shakspere Gallery' he produced two of his best works, the Murder of the Two Princes in the Tower, and Hubert and Arthur, besides some other subjects. Yet his ability in art was not equal to his enthusiasm and his application. His literary productions are far from being inconsiderable. Many papers of his appeared in a work entitled 'The Artist,' and in 1813 he published his 'Memoirs of Sir Joshua Reynolds, with an Analysis of his Discourses,' a quarto volume, to which he afterwards added a supplement. In 1828, at the age of 82, he brought out his 'One Hundred Fables, original and selected;' and two years afterwards, his 'Life of Titian.' Neither did he lay aside his pencil, till within a day or two of his death, which happened at his house in Argyle Street, July 13, 1831.

NORTHLEACH. [GLOUCESTERSHIRE.]

NORTHUMBERLAND, a county of England, is bounded N. by Norhamshire and Islandshire, two divisions which constitute a detached part of the county of Durham, E. by the German Ocean, S. by the county of Durham, S.W. by Cumberland, and N.W. by Berwickshire, and Roxburghshire. Its greatest length N. to S. is 60 miles; its greatest breadth E. to W. is 45 miles. The area is 1871 square miles. The population in 1841 was 250,278.

Surface and Rivers.—Northumberland is a rugged county. The highest hills are on the north-west border, towards Scotland. They are commonly designated the Cheviot Hills, which name is in strictness limited to one group among them. They extend from the neighbourhood of Wooler towards the south-west. The Cheviot Hills, properly so called (2657 feet high), are near the northern extremity. These hills have in several instances a conical form, and some are nearly perfect cones; they are covered with a fine green turf, and afford excellent pasture for sheep. Another range of hills, nearly parallel to the range just described, extends from the east of the junction of the Till with the Tweed southward to the bank of the Tyne. The hills south of the Coquet form part of the extensive moorlands which occupy a third part of the county, and have an average elevation of from 500 to 1000 feet above the level of the sea. There are not many hills south of the Tyne.

The coast is low. There are no cliffs, except very low ones, throughout its whole range. From the mouth of the Tweed at Berwick it runs south-east to Sunderland Point. In this part are two bays: the larger, opposite Holy Island; the other, Buddle Bay, into which a little stream, the Warn-

burn, flows, is more to the south-east. From Sunderland Point the coast runs south by east to the mouth of the Tyne.

The south-eastern part of the county, bounded by a line drawn from Warkworth, at the mouth of the Coquet, by the head of the river Blyth, to the Tyne, and thence southward to the bank of the Derwent, is included in the great coal-field of the counties of Northumberland and Durham. [COAL-FIELDS.] This coal-field is skirted on the north-west by a belt of land occupied by the millstone-grit. Beyond the millstone-grit district is a belt of land, still narrower than the foregoing, occupied by the carboniferous or mountain limestone. Nearly all the rest of the county is occupied by a series of formations comprising sandstones of various kinds, limestone, slate clay, shale, and coal.

The rivers of Northumberland rise for the most part in the eastern slope of the hills of the north-western boundary, and flow eastward across the county to the German Ocean. The Tweed lies to the west of this range, and belongs chiefly to Scotland. The chief among the rivers are—the Till, the Aln, the Coquet, the Wansbeck, the Blyth, the North Tyne, and the South Tyne, all of which have many small tributaries. The river Tyne is formed by the junction of the North Tyne and South Tyne near Hexham, and flows thence 30 miles past Newcastle to the sea.

The salmon fishery of the Tweed is very important, and a considerable number of boxes of that fish packed in ice are sent from that river to the London market, besides what is salted.

The railway communications of Northumberland centre in the town of Newcastle, where they are noticed.

Soil and Agriculture.—The position of this county causes the climate to be considerably colder and the harvest later than in the southern and midland counties.

Along the coast and for some miles inland the soil consists of a strong fertile clayey loam well adapted to the growth of wheat, beans, and clover, and there are some excellent natural meadows and pastures. Along the banks of the Tyne and the Coquet, and along the Aln from Alnwick to the sea, the soil is chiefly a light gravel, sand, or dry loam, which is likewise the case to a great degree in the vales of the Beamish, Till, and Beaumont. In the middle and south-eastern parts of the county the soil is a moist loam on a cold impervious clay bottom, which is of inferior value until it has been improved by draining and careful cultivation.

The county of Northumberland has been one of the foremost of the English counties in adopting the improved system of agriculture, the chief feature of which is the cultivation of turnips for the rearing and fattening of cattle. Turnips accordingly occupy a large proportion of every farm the soil of which admits of this cultivation. So great has been the advantage derived from this change from the old triennial system, that many fields now yield heavy crops of this useful root, which in most other parts of England would be considered as totally unfit for its cultivation.

This has arisen from the early adoption of the culture in rows on elevated ridges.

Though you may traverse the whole of Northumberland without meeting with a single field of turnips sown broad-cast, the drilling of other crops is by no means so common as in Norfolk and Suffolk, where most of the turnips, on the other hand, are still sown broad-cast. Potatoes are raised to a considerable amount on some very good sands and loams.

The instruments of tillage are mostly of improved make. The ploughs are generally iron swing-ploughs, on the principle of the old Rotherham plough, which was originally copied from the Belgian plough, and afterwards improved. The harrows, rollers, scarifiers, &c., are as in other counties. Threshing-machines, moved by water, wind, or horses, are thought essential on the larger Northumberland farms; and there is no prejudice against them among the labourers, but the contrary.

There are not many meadows, properly so called, in Northumberland, and few are artificially irrigated. Some rich upland pastures are mown annually, or every two or three years, for hay, and fed off the remainder of the time. Some are occasionally invigorated with manure, chiefly composts of earth, lime, and dung, well mixed and incorporated, which is put on in winter, when farm-work is slack.

The cattle in Northumberland are generally of good breeds, mostly short-horned. Those bought to fatten are chiefly Scotch. The cows kept for the dairy are almost invariably of the short-horned Durham breed; and many remarkably fine heifers are reared in the county, some of which travel southward and supply the large dairies of the London milkmen. The calves are reared on milk at first, gradually mixed with water and meal, till they can live on grass alone and run in the pastures. Excellent farm-horses are bred in Northumberland. They are active, with clean legs, and are very muscular and hardy. The sheep are chiefly of the native Cheviot breed, a useful hardy sheep, with a small fleece of moderate wool. A cross between a Cheviot ewe and a long-woolled ram is said to produce a useful breed, improved in the carcass and in bulk, if not in the fineness of the fleece.

There are no very extensive old woods in the county, but many thriving plantations. There is a constant demand for small timber for the use of the coal-mines.

Divisions and Towns.—Northumberland is divided into 6 wards. It is in the diocese of Durham. The county is in the Northern Circuit, and the assizes are held at Newcastle. For parliamentary purposes the county is divided into two divisions, Northern and Southern, each of which returns 2 members. The borough members are—2 for Newcastle-upon-Tyne, 1 for Morpeth, and 1 for Tynemouth: in all 8 members. Berwick-on-Tweed also returns 2 members.

The following are the principal towns, with the population of each in 1841:—

Allendale, a market town, 10 miles S.W. from Hexham, is situated on the east bank of the East

Allen brook, an affluent of the Tyne. The chief employment of the inhabitants arises from the lead-mines in the neighbourhood, and the smelting-houses connected with them. Population of the town, 1217.

Alnmouth, a small town and port, 23 miles N. from Newcastle, is situated at the mouth of the Aln, and may be regarded as the port of Alnwick. There is a considerable export of corn and other agricultural produce to the metropolis, and of wool to the manufacturing districts of Yorkshire. Population, 480.

Alnwick. [ALNWICK.]

Bamborough, a village, situated on the coast, 14 miles N. from Alnwick, was formerly a royal burgh, and returned 2 members to parliament. The castle, one of the oldest in the kingdom, stands on a perpendicular rock 150 feet above the sea, and is only accessible on the south-east side. The cluster of rocks called the Fern Islands are very dangerous in hazy and stormy weather, and signals are made from the castle to warn vessels of their danger. A life-boat is also kept, and sent out when required. Population of the village, 375.

Belford, a market-town, 13 miles N. by W. from Alnwick, stands on a gradual slope about 2 miles from the sea. It consists of two principal streets, and the houses are in general neat and well built. Population of the township, 1789.

Berwick. [BERWICK-UPON-TWEED.]

Blytha, or *South Blythe*, a small sea-port town 12 miles N. by E. from Newcastle, on the south bank of the river Blyth, at its entrance into the German Ocean. The town owes its prosperity to its commodious and safe harbour for small vessels. In full tides there are 10 feet of water on the bar. The town is well built, and has a custom-house, subject to that of Newcastle. There are dock-yards in which small vessels are built. Population of the township, 1774.

Corbridge, a village, 17 miles W. from Newcastle, is situated on the north bank of the Tyne, over which there is a bridge of seven arches. It consists of a main street and several smaller streets. There is a spacious market-place. The parish church is a very ancient structure. Population of the township, 1356. At Stagshawbank, 2¼ miles N.E. from Corbridge, one of the largest sheep-fairs in the north of England is held.

Haltwhistle, a market town, 35 miles W. from Newcastle, near the line of the Newcastle and Carlisle Railway, is situated on an eminence on the northern bank of the South Tyne, and consists of one principal street, and some smaller streets. The Haltwhistle Burn, a small stream from the north, passes the east end of the town in its course to the Tyne. The houses are poor and irregularly built. Population of the town, 984. There are many coal-pits in the parish.

Hartley, a village, 10 miles N.E. from Newcastle, is situated about a mile S. from the Seaton Sluice, a haven constructed at the mouth of the Seaton Burn, which flows into the sea in this township. This haven was improved by Lord Delaval, who made a new entrance by a cut through the solid rock, an improvement which has rendered the harbour accessible at all times; it is capable of holding 12 or 15 vessels of 300 tons, which can ride in safety, and enter or leave the harbour fully laden. The principal trade of the place is in the coals dug from the collieries of the parish. Population of the township, 1911.

Hexham, a market-town, 20 miles W. from Newcastle, on the line of the Newcastle and Carlisle Railway, is situated on an eminence near the south bank of the Tyne, a little below the junction of the North and South Tyne. It consists of several streets, the principal of which are tolerably wide, but the rest are generally narrow. In the market-place is an ancient stone building, with a dial in front, formerly used as the town-hall of the bishops and priors of Hexham, and now used as a sessions-house. There is a bridge over the Tyne of nine principal arches, and three supplementary arches to allow passage to the waters in time of floods; a suspension bridge crosses the South Tyne near the town; and there is a bridge with two arches over a burn west of the town. In the 12th century the Archbishop of York established here a priory of regular canons of St. Austin, and the most important building is the old priory church, now used as a parish church. It is a cruciform building with a central tower. There is an ancient crypt, supposed to be part of the original Saxon church which preceded the priory. At the west end of the church are the remains of the monastic buildings; the refectory is yet entire, and is occasionally used as a room of entertainment; it is very spacious, and has an oak roof. Population of the township, 4742.

Morpeth, a municipal borough and parliamentary borough, 16¼ miles N. by W. from Newcastle, on the line of the Newcastle and Berwick Railway, stands on a peninsula formed by the windings of the river Wansbeck, over which there are two bridges. The municipal borough is governed by 4 aldermen and 12 councillors. The church is ancient, and nearly half a mile from the town. In the southern suburb stands the county gaol, near which are the remains of Morpeth Castle. The town contains a town-hall, dispensary, savings-bank, and mechanics' institution. Population of the parish, 4237: of the parliamentary borough, 7160.

Newcastle, distinguished from other places of the same name as *Newcastle-upon-Tyne*, is a municipal borough, parliamentary borough, and the chief town of the county of Northumberland. It is also a county of a town. The assizes and quarter sessions for Northumberland are held at Newcastle. The municipal borough is divided into 7 wards, and is governed by 14 aldermen and 42 councillors. Population of the town and county of a town, 49,860; of the parliamentary borough, which returns 2 members, 69,430.

Newcastle appears to have derived its origin from the *Pons Ælii*, the second station from the eastern extremity of the Roman wall. The town derived its present name from a fortress built by Robert, eldest son of William the Conqueror (1079 to 1082). Newcastle is situated on the summit and declivities of three lofty eminences, rising from the north bank of the Tyne, and 10 miles from its mouth. It extends about 2 miles

along the bank. The town of Gateshead, in the county of Durham, occupies the opposite bank, and may be regarded as a sort of suburb of Newcastle. The town is very well provided with railway accommodation. The Newcastle and Carlisle Railway extends across the island nearly from one sea to the other. The North Shields line passes through North Shields to Tynemouth; the Newcastle and Berwick Railway establishes a communication with Scotland; lastly, the Durham railways, which, taking their departure from Gateshead, open up a communication with South Shields, Sunderland, Durham, York, and the south of England generally. By these communications, Newcastle is distant N.W. by N. from London, 303½ miles; S.E. by S. from Berwick, 65½ miles; and N. by W. from York, 83½ miles. A station near the centre of the town, which is to form a junction with all these lines by means of viaducts, has for some time been in progress, and will probably be completed during the present year (1849). The most important part of this work is a bridge across the Tyne, undertaken by the railway companies. It is a double bridge, the lower one at an elevation of 90 feet above the river, for carriages and foot passengers, and a railway bridge at a further elevation of 25 feet. The railway bridge is at present (Sept. 1, 1849) completed for one line of rails. The whole length of the structure is nearly 1400 feet. It has two piers at the margin of the river, and four others in the stream itself, besides smaller piers to support the land arches. The High Level Bridge is considered one of the most astonishing structures in the kingdom.

In the central part of the town, which is the oldest part, the streets were inconveniently narrow, and lined with low houses; but within the last 20 years very great improvements have been made, and Newcastle now possesses one group of streets which are perhaps equal to any other in the kingdom. In 1835 a very fine market was opened. Other buildings of recent construction are—the central exchange, theatre, dispensary, music-hall, lecture-room, 2 new chapels, the Incorporated Company's Hall, 2 auction marts, and several inns, all of which belong to the group of buildings above spoken of. The town is connected with Gateshead by an elegant stone bridge of nine elliptic arches, erected (1776-1781) in place of a former bridge destroyed (1771) by a great landflood. It was widened in 1801. There are two streams running into the Tyne, one of which, the Pandon Burn, flows on the north side of the town, and then turning south runs through or rather under one part of the town (for it is arched over) into the Tyne, about a quarter of a mile below the Tyne Bridge; the other, the Ouse Burn, runs on the east side of the town, and is crossed in several places by bridges over which roads lead from Newcastle to the places adjacent. It joins the Tyne half a mile below the Pandon Burn. A handsome bridge of three arches, built in 1812, spans the deep and narrow valley of Pandon Dean. The church of St. Nicholas, in the centre of the town, is a large and handsome cross-church, 245 feet in length: it is chiefly of decorated English character. The steeple, which is at the west end, 201 feet high, is the most beautiful feature in the building, and is of late perpendicular. St. Andrews church, on the N.W. side of the town, is a very ancient structure, part of it being of Norman architecture. St. John's, near the west gate, is a large cross-church, chiefly of early English character, with a square embattled tower. All Saints church, near the centre of the town, is a modern edifice of Grecian architecture, with a steeple 202 feet high. Besides these there are—St. Ann's chapel, St. Thomas's chapel, and a number of dissenting places of worship. The town and county gaol is a massy stone building of modern erection. The moot-hall, or county court-house, erected in part of the precincts of the ancient castle, is a building of elegant proportions. Much of the old castle, which was formerly used as a county prison and for holding the assizes, is yet standing; many alterations have been made in it, but it is now to be restored by the Antiquarian Society of Newcastle. Among the other institutions in the town may be noticed—the infirmary, a lying-in-hospital, a lunatic asylum, Jesus Hospital, the Literary and Philosophical Society, a literary and scientific institution, the Natural History Society, for Northumberland, Durham, and Newcastle; the assembly-rooms, riding school, public baths, and two cemeteries. The free grammar-school was founded by Thomas Horsley, who was mayor of Newcastle in 1525. There are numerous other schools.

The commercial importance of Newcastle arises from its situation on a river navigable thus far by sea-borne vessels of 400 tons. The Tyne forms the haven, and is under the care of the corporation. The river side is lined with warehouses and extensive quays. The chief business is in the shipment of coals, the produce of the surrounding coal-pits. The coals were formerly brought down the river in barges called keels, but vessels are now chiefly loaded from staiths. Coal is exported very considerably; also lead, cast and wrought iron, glass and pottery, copperas and other chemical productions, soap, colours, grindstones, salt, and pickled salmon. The imports are wine, spirituous liquors, and fruit, from the south of Europe; corn, timber, flax, tallow, and hides, from the Baltic; and tobacco and various other articles from North America. The number of sailing vessels registered at the port on Dec. 31, 1847, was as follows:—Under 50 tons, 99; above 50 tons, 1303; the aggregate burthen being respectively 3168, and 308,135 tons. The number of steam-vessels was—under 50 tons, 155; above 50 tons, 5; the aggregate burthen being respectively 2545 and 860 tons. Several steamboats ply between Newcastle and North and South Shields.

The chief manufactures are of glass-bottles and plate and crown glass, steam-engines, mill-work, and other machinery. A number of persons are engaged in ship and boat building, block, mast, and sail-making, flax-dressing, rope-making, &c. There are several malt-houses, breweries, flour-mills, iron and lead-works, and chemical works.

The inland trade of the town is considerable: there are two weekly markets, Tuesday and

Saturday. A Chamber of Commerce has been established for many years.

Rothbury, a market-town, 25 miles N.W. from Newcastle, is situated on the north bank of the Coquet. Rothbury consists of three streets, wide, airy, and lined with tolerably well-built houses. The market-place contains a cross. The church, which is very ancient, was formerly larger than at present. The Coquet is crossed by a stone bridge of three arches. Population of the parish, 2555.

Tynemouth, a parliamentary borough, 10 miles E. from Newcastle, is connected with Newcastle by railway. Tynemouth Castle, situated on the high ground at the mouth of the Tyne, was erected by William the Conqueror, and included the monastery built by Oswald, king of Northumbria, and suppressed at the Reformation. Considerable remains still exist both of the priory and the castle. There are a lighthouse and some other modern buildings in the castle, and a fort which commands the entrance of the river. Tynemouth consists chiefly of one long street, and is a favourite bathing-place. The parish church is at the eastern end of North Shields. The parliamentary borough, which returns one member, includes the township of Tynemouth (population 11,890) and the township of North Shields (population 7509). Population of the parliamentary borough, 25,165.

North Shields is a market-town and port, which is included in the borough of Tynemouth. It extends about a mile along the north bank of the Tyne. The old part consists of narrow streets and alleys; the newer part has spacious streets and squares. Clinton and Preston villages lie back from the river, and will probably, by the extension of North Shields, be incorporated with the town. The great trade of the place is from the collieries. Ship-building is actively carried on. Population of the township of North Shields, 7509.

Warkworth, 25 miles N. from Newcastle, on the Alnmouth branch of the Newcastle and Berwick Railway, is situated on the south side of the river Coquet. The town contains a number of good houses. The church is an elegant and spacious building, part of which is of considerable antiquity. Immediately adjacent to the town is Warkworth Castle, a noble pile, finely situated on an eminence above the river Coquet. There is a bridge of two arches over the Coquet, at the north side of the town. In the perpendicular rocks which form the north bank of the Coquet, about a mile above the bridge, is a hermitage, consisting of two apartments hewn out of the rock, with a lower and outward apartment of masonry, built up against the side of the rock, which rises about 20 feet high. Population of the parish, 3512.

Wooler, a market-town, 45 miles N.W. from Newcastle, consists of a number of ill-paved streets and lanes, with the market-place in the centre. The church is a neat building, erected about the middle of the last century. Population of the parish, 1874.

History and Antiquities. — In the earliest period of the history of Britain, the eastern side of this county and the adjacent parts of Scotland were inhabited by the Otadeni. On the west of the Otadeni, in Northumberland, Cumberland, and Galloway, were the Gadeni.

There are several remains of the primitive inhabitants of the country, consisting chiefly of rude hill-forts, cairns, and Druidical monuments. Of these British remains, one of the most remarkable is on Yevering Bell, near Wooler, where the nearly level summit of an oblong mountain, which rises 2000 feet above the adjacent plain, is encircled with the remains of a wall built of large flat whinstones without mortar, and inclosing a considerable area. The medium breadth of the ruined wall is 8 feet. Between the village of Ilderton and Hedgehope, one of the border hills, is a Druidical monument consisting of ten large rude and unequal stones, arranged so as to inclose an oval area of 38 yards from E. to W. by 33 from N. to S. There are several remains of Roman encampments. The most remarkable monument of the Roman dominion is the great line of defence formed and augmented by the successive labours of Agricola, Hadrian, and Severus; and sometimes called the Picts Wall, sometimes the Roman Wall. [BRITANNIA.]

Of many centuries of strife and consequent misery this county contains many memorials. The ruins of Norham and Wark castles still overlook the Tweed, and those of Heton, Dudhowe, and Ford rise on the banks of the Till or its tributary streams. Bamborough and Dunstanborough castles are on the coast. In the interior of the county are Alnwick Castle, and Warkworth Castle. Prudhoe Castle, on the south bank of the Tyne, between Newcastle and Hexham, is one of the finest ruins in the county; it stands on a precipitous bank of the river 60 feet high. There are several other remains of castles. Of Hulne Abbey, close to Alnwick, there are some remains. Brinkburn Priory, near Rothbury, for regular canons of St. Augustin, has been in great part demolished. There are ruined churches or chapels at Old Bewick, between Alnwick and Wooler; Memmer-Kirk, near the border of Scotland; Bothall, near Morpeth; and Jesmond, near Newcastle. In the troubles of Charles I.'s reign this county suffered considerably.

NORTHWICH. [CHESHIRE.]

NORWAY, a country in Europe, which comprehends the western portion of the Scandinavian peninsula, extends from 58° to 71° N. lat., and between 5° and 28° E. long. Its length is about 1100 miles; its width varies from 20 to 250 miles. The area is about 134,500 square miles. On the N. and W. it is surrounded by the Atlantic Ocean, and on the S. by the North Sea and the Skager-Rack. On the E. is Sweden, and towards the N. Russia.

Mountains; Rivers; Lakes. — By far the greatest part of this extensive country is covered with mountains, which constitute an immense rocky mass, called in the southern part Norrska Fiellen, and in the northern Kiölen. More than three-fourths of the country are occupied by the Norrska Fiellen, the highest part of which that has been measured is at the innermost recess of the Sögne Fiord, and is 7647 feet above the sea-

level. The Norrska Fiellen generally are above 2000 feet higher than the sea-level, and unfit for cultivation, except in a few well-sheltered places. More than half of the Kiölen is above 800 feet higher than the surface of the sea. The lowest tract, which does not rise to 300 feet, is situated on both sides of the Bay of Christiania. The more elevated country, which rises to between 300 and 800 feet, partly surrounds this low tract, and partly extends along the shores of the Skager-Rack, or encloses the Bay of Trondhiem on the south and east. Cultivation is nearly limited to these two regions. About 3284 square miles of the mountain-masses are always covered with snow.

As all the rivers of this country rise at a great elevation above the sea, and have a comparatively short course, they are not fit for navigation. Some of them however are used to float down timber, at least in a part of their course. The largest of these rivers is the Glommen-Elf, which has a course of about 400 miles, interrupted by many cataracts. It receives the Wormen-Elf, which is the outlet of Lake Miösen. The Lougen-Elf flows into Lake Miösen, which is 60 miles long, and from 1 to 5 miles wide. The Drammen-Elf flows into the Gulf of Christiania. The other rivers remarkable for the length of their course are—the Louven-Elf, the Skeen-Elf, and the Otter or Torrisdals-Elf, which run from 120 to 150 miles each, and fall into the Skager-Rack. Besides these, the chief rivers are the Namsen-Elf, Alten-Elf, and Tana-Elf.

Christiania Fiord and Trondhiem Fiord are surrounded by fertile tracts. The other fiords are generally inclosed by high and barren rocks. Bukke Fiord is wide at its entrance, and penetrates by two of its branches more than 50 miles inland. Hardanger Fiord is about 70 miles long. Sögne Fiord, which is narrow, and more than 80 miles long, is surrounded by the highest region of the Norrska Fiellen. There is a great number of narrow deep fiords between Sögne Fiord and Trondhiem Fiord, and of bays farther north. The largest and widest occur at the northern extremity, where the Porsanger Fiord is 150 miles long and 20 miles wide on an average.

Numerous lakes occur in the southern districts of Norway, on the eastern declivity of the Norrska Fiellen. Many of them are more than 2000 feet above the sea-level, and all of them are very deep. Lake Fämund, near the boundary of Sweden, is 2280 feet above the sea-level, and extends in length more than 70 miles, with an average width of more than 3 miles. From its southern extremity issues a river, which, under the name of Klar-Elf, falls into Lake Wenern in Sweden.

Climate and Productions.—The climate differs considerably in the different districts. The following are the mean temperatures, taken at four places by Fahrenheit's thermometer:—

	Winter.	Summer.
Christiania . . .	25°	60°
Bergen . . .	36°	58°
Trondhiem . . .	24°	61°
North Cape . . .	24°	42°

The winds and snow-storms are often exceedingly violent, and are generally preceded by thick fogs.

The forests constitute the principal wealth of Norway. Beech, pine, fir, oak, elm, and lime, are the principal timber trees. Apples, cherries, and prunes are found as far as 64° N. lat., but they do not ripen every year. Gooseberries and hazel-nuts extend to 65° N. lat., and so far oats, peas, beans, and flax are cultivated. Hemp and rye are grown to 66° N. lat., and the ash and spruce-fir reach this point. Though agriculture is not neglected, the produce of the crops is not sufficient for home consumption.

Cattle and goats are numerous, but sheep are rare. The horses are of a small size in the southern districts, but larger to the north of Trondhiem: they are strong and hardy. Bears, wolves, foxes, gluttons, ermines, as well as reindeer, elks, deer, and hares, abound. Sea-fowl and eider ducks are plentiful. The sea furnishes the principal means of subsistence to the inhabitants of the western coasts; cod, herrings, salmon, and lobsters, are plentiful.

Population; Commerce; Manufactures.—The Norwegians, like their neighbours the Danes and Swedes, are of Teutonic origin, and speak a language which differs very little from the Swedish. It is supposed that the language of the Norwegians has undergone less change than that of their neighbours. In the most northern districts, north of 69°, there are many families of Finlanders and Laplanders.

Norway was from an early period divided into four bishoprics: Christiania, Christiansand, Bergen, and Trondhiem, with one civil governor for each bishopric. The bishopric of Trondhiem has been divided into two, Trondhiem and Nordland. Norway is subdivided into districts, the area and population of which in 1845 were as follows:—

Names of the Districts.	Sq. Miles.	Population.
Smaalehnenes . .	1,625	61,593
Aggerhuus . . .	2,028	78,532
Hedemarkens . .	10,475	89,810
Christians. . . .	10,367	106,840
Buskereds . . .	5,269	74,083
Iarlsbergs and Laurvigs	943	54,870
Bradsbergs . . .	6,121	64,090
Nedenaes . . .	4,685	47,608
Mandals	2,247	48,937
Stavangers . . .	4,672	69,200
Söndre Bergenhuus	6,918	69,366
Nordre Bergenhuus	8,272	79,447
Romsdals	6,532	77,542
Söndre Trondhiems	7,808	75,653
Nordre Trondhiems	9,541	67,351
Nordlands . . .	16,570	65,990
Finmarkens . . .	30,236	36,854
Total. . .	134,309	1,167,766

CHRISTIANIA is the capital of Norway. The other principal towns are—BERGEN, CHRISTIANSAND, and TRONDHIEM. *Hammerfest*, a small town and port on the island of Qualöe, in 70° 40′

N. lat., 23° 38′ E. long., is probably the most northern town of civilized Europe.

Perhaps less than half the population gain their subsistence by cultivating the ground. The remainder employ themselves chiefly in fishing, in preparing the produce of the forests for the market, and in working in the mines. The manufacturing industry is comparatively very small.

The foreign commerce is considerable, as the greatest part of the produce of the forests, the fisheries, and mines is sent out of the country.

History and Constitution.—The Norwegians first appear in history as pirates, who frequently visited and laid waste the countries bordering on the North Sea. Norway was then governed by a great number of small princes, whose ambition led them to continual wars; but in 875 the small kingdoms were united under King Harold Harfagra, and from that time they became still more troublesome to their neighbours, until Norway was connected with Denmark, and then the Norwegians accompanied Sveno and Knut to the conquest of England. But the two kingdoms were soon separated again, and remained so till 1387, when Margaret became queen of Denmark and Norway. From that time till 1814 both countries remained united, and Norway was administered by a governor, appointed by the King of Denmark; but since 1814 Norway has belonged to Sweden, but it has a distinct constitution.

The legislative body, or Storthing, is composed of the representatives of the people. The members of the state council and the persons employed in state offices cannot be representatives, nor can those who belong to the royal household: but clergymen are eligible. The king or his lieutenant opens the Storthing, immediately after which it separates into two bodies, the Lagthing (or legislative body), and the Odelsthing (assembly of landed proprietors). The Lagthing consists of one-fourth of the members of the Storthing chosen by the whole assembly. The Storthing is empowered to abolish old and to enact new laws, to impose taxes or abolish or change them, to determine the civil list of the king and the salaries of the persons employed by government, &c.

The executive power is vested in the king. The Storthing does not interfere in any way with his arrangement of the department of war. But before the king declares war he must inform the council of state at Christiania of such proposed step. The Odelsthing may examine the proceedings of the council of state, and, if there is reason for it, bring it or any member of the body to a trial. The Lagthing, united with the supreme court of justice residing at Christiania, constitutes the court which has jurisdiction in such a case.

NORWICH, a parliamentary borough, municipal borough, and a city and county of itself, is the capital of the county of Norfolk. It is 126 miles N.E. from London, by the Eastern Counties Railway. It communicates with Yarmouth by means of the same line. The Ipswich and Bury Railway is completed. The Ipswich and Norwich Railway is nearly completed (Sept. 1849).

Norwich appears to have risen gradually from the decay of Caistor or Castor St. Edmunds, now an inconsiderable village, about 3 miles S. from Norwich, but anciently a Roman town named Venta Icenorum. In the time of Edward the Confessor Norwich had become a flourishing town. In 1403 Henry IV. separated the city of Norwich from the county of Norfolk, and made it a county of itself. In the earlier years of Elizabeth's reign the Flemings, who fled from the persecutions of the Duke of Alva, settled at Norwich to the number of 4000, and much increased the prosperity of the town by the introduction of the bombazine manufacture.

The county of the city of Norwich extends about four miles from N. to S., and as many from E. to W. The town itself is not exactly in the centre of this district, but rather to the N.E.; and extends about a mile and a half in length from N.W. to S.E., and from three-quarters of a mile to a mile in breadth. It is of irregular form, and very irregularly laid out. The streets are narrow and winding; some of them follow the line of the ancient walls, which are partly standing. The town stands on a considerable space of ground for its population, the houses being much intermixed with gardens, so that it has been designated 'a city in an orchard.' The market-place is one of the most spacious in England. The streets are paved, and lighted with gas. The increase of buildings has been of late years very considerable, principally on the west side of the town. The modern parts are well built. The river Wensum enters Norwich on the N.W. side, and winds partly through, partly round the town, until it finally leaves it on the S.E. side: it is crossed by at least ten bridges in the town or close to it.

The most interesting of the public buildings are the castle, erected by the Normans, and the cathedral. The inner ditch of the castle and the bridge over it still remain. The entrance tower, of richly-ornamented Norman architecture, known as Bigod's Tower, has been restored. The eastern front has been renovated.

The foundation of the cathedral was laid in 1094, by Herbert Losinga, the bishop in whose time the see was removed from Thetford to Norwich; but he finished only the choir and tower: succeeding bishops added the other parts of the building. The entire length of the cathedral from E. to W. is 411 feet; the breadth at the transepts, 191 feet; the breadth of the nave and side-aisles is 71 feet. The height of the tower and spire, with the weathercock, is 313 feet. The plan is almost wholly Norman.

The parish churches of Norwich are very numerous. Some of them are valuable specimens of ancient architecture. Those of St. Bennet, St. Ethelred, and St. Julian, have round towers, usually considered to be of early Norman date. The most conspicuous church is that of St. Peter Mancroft, a large and fine perpendicular church, with a lofty tower and handsome windows. There are some other buildings which are the remains of ecclesiastical edifices. There are numerous places of worship for dissenters.

The Guildhall is a large old building, erected in the 15th or 16th century, and since repaired

or altered. The city gaol is a massive and appropriate building; there is also a bridewell. The shire-hall, in the castle ditch, is a brick building in the Tudor style, cased with cement. The county gaol, in connection with the castle, is a commodious building. The charitable institutions and schools are very numerous.

The most important trade of the town consists of the manufacture of silk and worsted into shawls, crapes, bombazines, damasks, camlets, and imitations of the Irish and French stuffs. The corn-market is held in a large handsome building, the Corn Exchange, erected for the purpose, and the cattle-market is in an open area adjacent to the castle. Trade in agricultural produce, coals, and other heavy goods, is carried on by means of the river, chiefly in lighters of from 15 to 20 tons burden. To facilitate the approach of sea-borne vessels, to which the harbour has been made to some extent accessible, an entrance has been made from the sea into the navigable channel of the Waveney, by Lake Lothing, and a ship-canal from the Waveney to the Yare or Wensum. There is another short canal near Norwich. These various cuts with the river are navigable for vessels not exceeding ten feet draught of water. The harbour, lock, and sluice, at the sea entrance of this navigation, are extensive works.

The municipal borough is divided into 8 wards, and is governed by 16 aldermen and 48 councillors. Population of the city, 62,344. Population of the parliamentary borough, which returns two members, 60,982.

NORWICH. [CONNECTICUT.]

NORWOOD, RICHARD, a mathematician of the earlier part of the 17th century, of whose personal history we know nothing. He is principally famous for having been the first who measured a degree of the meridian with accuracy. His method was this:—In the year 1635 he measured the distance between London and York, taking the bearings as he proceeded along the road, and reducing all to the direction of the meridian and to the horizontal plane. The difference of latitude he found by observation of the solstices to be 2° 58′, and from that and his measured distance he concluded the degree to be 367,176 feet English. 'Sometimes,' says he, 'I measured, sometimes I *paced*, and I believe I am within a scantling of the truth:' and so he was, giving too much by about one foot in 180.

NOSE, one of the external apertures of the respiratory system, and the organ for the sense of smell. The portion of the nose by which odours are perceived lies deep back in the cavity to which the external apertures of the nostrils lead; the portion which is prominent upon the face serves merely as the apparatus for inhaling the air which is impregnated with the odour. The most essential parts of the organ are the olfactory nerves, which come off from the olfactory bulbs of the brain [BRAIN], and passing through numerous holes in the ethmoid bone, which is situated between the orbits and above and behind the nostrils, ramify on the extended surfaces of that bone and the turbinated bones which form on each side the chambers of the nose. The sensitive terminations of the nerves are placed on the surface of a delicate and very vascular membrane which lines the whole cavity of the nose, and which is constantly kept moist by the secretion of a small quantity of mucus, in which the odoriferous particles are caught and for a time retained.

The sense of smell varies considerably, both in degree and in kind, in different animals. It is evidently possessed by insects and many others of the lower animals, but the organs by which they exercise it are unknown. In the higher animals its degree of acuteness is in general marked by the extent of surface of the ethmoid and turbinated bones, over which the olfactory nerves are distributed.

The olfactory nerve is appropriated exclusively to the sense of smell, and is incapable of perceiving pain or any other sensation. Of the peculiarities by which in different animals it is capable of perceiving only certain odours, we know no more than of the nature of those odours themselves, of whose existence we have no other evidence than that of the sense which they affect.

The sense of smell serves as an adjunct to that of taste, and is subservient in most instances to the same purpose, of providing proper and avoiding injurious food for the sustenance of the body.

NOSO'LOGY (*from νόσος and λόγος*) is the term applied to the classification and arrangement of diseases. It was early found in the observation of the symptoms of disease, that many of them recurred again and again, and this led to the assigning to such groups of symptoms particular names. Thus we find that the term fever was early applied to designate a certain set of symptoms, and, as any of these symptoms preponderated, the fever obtained a specific name, as putrid fever, petechial fever, &c. But not only were symptoms had recourse to for the purpose of distinguishing peculiar forms of fever, but the causes and the locality were frequently employed; thus marsh, gaol, hospital, and other fevers have been described. In this way the materials were early accumulated for the formation of a system of nosology. It was not however till comparatively modern times, that anything like a scientific system of arrangement was proposed. One of the earliest of these was that of Sauvages, who, taking the most prominent symptoms of diseases as his guide, divided them into ten great classes which he named Vitia, Febres, Phlegmasiæ, Spasmi, Anhelationes, Debilitates, Dolores, Vesaniæ, Fluxus, and Cachexiæ. Under these classes were arranged various orders: thus, under the first class Vitia, he arranged the orders, Maculæ, Efflorescentiæ, Phymata, Exerescentiæ, Cystides, Ectopiæ, Plagæ. The order Maculæ was divided into the diseases Leucoma, Vitiligo, Ephelis, Gutta rosea, Nævus, and Ecchymoma. This classification of diseases was followed by those of Linnæus, Vogel, Sager, and Macbride, but in their arrangements they all recognised the same principle of classification as Sauvages, and made their division of diseases to depend on the greater or less prominence of particular symptoms. All these systems, were however supplanted by that of

Cullen, which he promulgated in the second edition of his 'Synopsis Nosologicæ Methodicæ.'

It was the simplicity of this system which recommended it to general adoption, and which has caused it to exercise so great an influence over other systems of pathology. At the same time, like the previous systems, it is purely artificial, and frequently brings together diseases of a very dissimilar character. Such systems have also led to the impression that diseases have a character as definite as the objects of natural history, and that a species in the one can be as easily defined as the species of another. But it becomes evident, after a little inquiry, that, with the exception of those diseases that depend on a specific contagion, no part of the idea of a species as applied to plants or animals can be made use of to designate particular diseases.

With the progress of a sound knowledge of physiology and pathology many attempts have been made to give a more natural arrangement of diseases than that of Cullen, but no one system can be said to be generally adopted.

NOSTRADA'MUS, or NOTRE DAME, MICHEL, was a physician, but is now only remembered as the author of the most celebrated predictions published in modern times. He was born at St. Rémy, a small town in the diocese of Avignon, on Dec. 14, 1503. He travelled over various parts of the continent for many years; and, besides the other sciences which he had previously acquired from his grandfather, paid particular attention to botany and medicine. He was very successful in the cure of the plague, by means of a powder of his own invention.

It was about 1547 that he first began to represent himself as divinely inspired, and endued with the gift of prophecy. His predictions were first written in prose; but, upon revising them afterwards, he threw them all into the form of quatrains, and then arranged them in three 'Centuries.' The first edition was published at Lyon (1555). Henri II. and his superstitious mother Catherine sent for him to Paris, received him at court, and made him a present of two hundred crowns. Encouraged by these favours, he increased his quatrains to the number of a complete thousand, and published a new edition of them, with a dedication to the king, in 1558. The next year that prince received a wound at a tournament, of which he died, and in the thirty-fifth quatrain of the first century were found the following lines:—

'Le lion jeune le vieux surmontera,
En champ bellique par singulier duel.
Dans cage d'or les yeux lui crevera.
Deux plaies une, pour mourir mort cruelle.'

So remarkable a coincidence greatly increased his fame, and Charles IX. presented him with a purse of two hundred crowns, together with a brevet constituting him his physician in ordinary, with the same appointment as the rest.

Nostradamus died July 2, 1566. After his death two more 'Centuries' were collected from his papers, &c., and added to his quatrains, and the whole work was translated into various foreign languages. Even as late as 1806 there appeared at Paris a work by Théodore Bouys, pointing out the fulfilment of several of his prophecies, particularly the death of Charles I. of England, and the elevation of Napoleon to the throne of France; with others to be securely expected, such as the length of Napoleon's reign, the peace he was to secure to the world, and his conquest of England.

The 'Centuries' of Nostradamus have been frequently reprinted, and numerous commentators have endeavoured to explain his predictions. The best editions are those of Lyon, 1568, 8vo., and Amsterd., 1668, 12mo. Before he wrote his 'Centuries,' Nostradamus had published during several years an almanac, containing predictions about the weather, &c., besides a few other works.

NOTARY. This word is derived from the Roman name *notarius*, a person who was so called from his taking down in notes or writing (notæ) the words of a speaker. The *notarii* were short-hand writers, and used symbols of abbreviation.

It is generally supposed that the power of admitting notaries to practise was vested in the Archbishop of Canterbury by the 25 Hen. VIII. c. 21, s. 4. The term of service and the manner of admission to practise are regulated by the 41 Geo. III. c. 79, amended by 6 & 7 Vict. c. 90. The licence or commission for acting as a notary in England requires a stamp duty of 30*l.*, and in Scotland one of 20*l.* An annual certificate is also required.

The original business of notaries was to make all kinds of legal instruments: they are often spoken of in former times as the persons who made wills (Shepherd's 'Touchstone,' vol. ii., 407, Preston's ed.); but the attorney and solicitor have now got possession of this part of their business. In practice their business is now limited to the attestation of deeds and writings for the purpose of giving them such authenticity as shall make them admissible as evidence in other countries, but principally such as relate to mercantile transactions. It is also their business to make protests of bills of exchange. They also receive and take the affidavits of mariners and masters of ships.

NOTATION. [SYMBOLS.]

NOTATION, in Music, signifies the method whereby the pitch, or tune, and duration of musical sounds are represented, and by which definite periods of silence, called *rests*, are marked:—it is to music what letters and punctuation are to language.

To show the pitch, the Greeks used the letters of their alphabet, placed in various positions. The Romans had recourse to the majuscules of their own alphabet for the same purpose, till the latter part of the 6th century, when Pope Gregory I. employed the seven first capital Roman letters for the first septenary, beginning with the A answering to the lowest space in our base clef. For the next ascending septenary he used the corresponding small letters; and the third he denoted by the same small letters doubled.

Guido, early in the 11th century, introduced, it is commonly supposed, the use of points instead of letters, which he placed on parallel lines, giving

names to the latter by means of letters. To Franco of Cologne we are indebted for characters which at once denoted both the tune and time of the sounds. He introduced the four symbols of very long notes, viz. the *Large*, the *Long*, the *Brove*, and the *Semibreve*; while the invention of the *Minim*, *Crotchet*, *Quaver*, and *Semiquaver*, is ascribed to John de Muris, a doctor of the Sorbonne, who made this important addition to notation, and also originated certain characters determining the measure, in the year 1338. Still shorter notes have been since introduced. Sharps, flats, naturals, bars, and ligatures, were all introduced into notation during the 17th century.

NOTE, in Music, a character which, by its place on the staff, represents a sound, and by its form determines the time or continuance of such sound. There are six notes in ordinary use,—the Semibreve, Minim, Crotchet, Quaver, Semiquaver, and Demisemiquaver. To these may be added the Breve, still met with in sacred music; and the half-Demisemiquaver, much used, and often unnecessarily, by the moderns. The value, or length in time, of the Semibreve may be considered as unity; the minim is $\frac{1}{2}$; the crotchet $\frac{1}{4}$; the quaver $\frac{1}{8}$; the semiquaver $\frac{1}{16}$, and the demisemiquaver $\frac{1}{32}$.

NOTES, BANK. [BANK, BANKER, BANKING.]

NOTHING. In the article INFINITE will be found as much upon this word as will enable us to dispense with the consideration of the symbol 0 as the limit approached but never attained by the continual diminution of magnitude.

Among the terms used in mathematical language are *nothing*, *cipher*, and *zero*. The first word, *nothing*, implies the absence of all magnitude, but its occurrence denotes either that magnitude did exist, or might have existed, or does exist under similar circumstances in other problems, or in the same problem under different points of view. Were it not for this, the word would be useless: thus we do not consider it necessary to speak of £20 generally as twenty pounds, no shillings, no pence, and no farthings. But if this £20 had been the amount of a number of sums, the symbol £20 0 0 would be useful as indicating that the results of an operation (addition) had left no quantities in places where beforehand quantity might have been expected. The term *unity* would have been useless in the same manner, except as a tacit reference to other units. Anything we please is *one* of its kind, and accordingly the indefinite article (a or an), which is certainly *one* in etymology, has lost its definite monadic signification, because such signification is useless. This point is of some importance to the mathematician, as justifying a use of the symbol 0 where it might seem redundant. The 0 and 1 are frequently useful as symbols of distinction where they are not wanted as symbols of operation: in like manner, in common language, the simple phrase '*one* ox and *no* sheep,' though it implies no more of positive conception than the more simple phrase 'an ox,' may be a proper description where the second would be no such thing.

The *cipher* is 0 considered in a purely arithmetical point of view, as the mode of denoting a blank column intervening between or following columns which contain significant numbers.

The term *zero* considers 0 rather as a starting point of magnitude than as the symbol for the recognition of absence of all magnitude, and really denotes, not the entire absence of magnitude, but the arbitrary determination to reckon all magnitudes by their excess or defect from a certain zero magnitude. Thus the zero point of the thermometer does not mean that shown when there is no temperature, but a certain temperature, that of freezing water; and degrees above and below zero indicate excesses or defects of temperature above or below that standard. It is then perfectly proper to say that ten degrees below zero is a lower temperature than five degrees, and that both are less than zero.

NOTTINGHAM. [NOTTINGHAMSHIRE.]

NOTTINGHAM, EARL OF. *Heneage Finch*, whose father was recorder of the city of London, was born in 1621. He was educated at Westminster school, and at Christ Church, Oxford. He became a member of the Inner Temple, London, was appointed solicitor-general, distinguished himself in the prosecution of the Regicides, and published an account of their trial, in 4to., 1660; 8vo., 1679. In 1661 he was elected member of parliament for the university of Oxford, and created a baronet. He took part in the impeachment of the Earl of Clarendon in 1667; and in 1670 was appointed attorney-general. He succeeded Shaftesbury as lord-keeper of the great seal in 1673, and in 1675 was made lord-chancellor. He presided on the trial of Viscount Stafford, in 1680, and pronounced judgment against that nobleman. He was created Earl of Nottingham in 1681, and died in 1682.

Besides the account of the trial of the Regicides, he published several speeches and some legal works. Lord Nottingham had a high reputation for sound judgment and integrity. His character is drawn by Dryden, in his 'Absalom and Achitophel,' under the name of Amri—

> 'To whom the double blessing does belong,
> With Moses' inspiration, Aaron's tongue.'

NOTTINGHAMSHIRE, an inland county of England, is bounded N.E. and E. by Lincolnshire, S.E. and S. by Leicestershire, W. by Derbyshire, and N.W. by Yorkshire. Its greatest length N. by E. to S. by W. is about 51 miles; its greatest breadth, at right angles to its length, is 26 miles. The area is 837 square miles. The population in 1841 was 249,910.

Surface and Rivers.—The surface of the county is undulating, except in the vale of Trent and the vale of Belvoir; but there are no very high hills. The northern boundary runs through the marshes that surround the Isle of Axholme. Beacon Hill, the Wold Hills, and Sherwood Forest, occupy the highest ground.

The strata which occupy the surface of this county succeed each other in order from east to west. The eastern and south-eastern border of the county is chiefly occupied by the lias. The vale of Trent and the uplands to the west of it are for the most part composed of rocks of the

red-marl or new red-sandstone group. The newer magnesian or conglomerate limestone underlies the red-marl; but in some parts these formations are separated by beds of quartzose gravel, extending to the depth of 600 or 900 feet. West of the magnesian limestone occurs the great coal-field of South Yorkshire, Derbyshire, and Nottinghamshire, of which coal-field only a small part is comprehended in this county. Between Mansfield and Nottingham the limestone immediately overlies the coal, but south-west of Nottingham the coal-measures crop out from beneath the red-marl which occupies the valley of the Trent. Coal, gypsum, building stone, and paving stone, are procured in the county.

The whole county belongs to the basin of the *Trent*, which river flows through it 25 miles in a north-east direction to the neighbourhood of Newark: below Newark it turns to the north, and flowing first within and then upon the border of the county 25 miles farther, to below Gainsborough (Lincolnshire), finally quits the county and flows through the marshes of the Isle of Axholme to the Humber. That part of its course which appertains to this county is about 53 miles. The *Idle*, after a course of 47 miles, falls into the Trent, after receiving the waters of the Rainworth, Maun, Meden, Wollen, Poulter, and Rayton. The Soar has about 8 miles of its course, navigable throughout, on the border of this county and Leicestershire, to which latter it belongs. The Erewash, the Lene, the Dover Beck, the Deven, and some of their small tributaries, flow through this county into the Trent.

The Erewash, the Cromford, the Nottingham, the Grantham, and the Chesterfield canals, pass through this county; as likewise do portions of the Midland, the Great Northern, and the Sheffield and Lincolnshire railways.

Soil and Agriculture.—The climate of this county is dry and healthy, and upon some of the light lands the harvest is as early as in many counties more to the south.

The county may be divided into three districts with respect to soil. In the first, sand and gravel prevail. This extends along the vale of Trent to the borders of Lincolnshire, and to the north of Nottingham along the ancient forest-land and border, in a strip of land about thirty miles long, and from seven to ten miles broad. The next is the clay, which lies between the Trent land and the last-mentioned strip, and in a part of the southern extremity of the county towards Leicestershire. The third district is that where limestone and coal are found. This lies partly on the borders of Derbyshire, and partly on the south-east, towards Leicestershire and Lincolnshire.

Before the inclosure of the forest-lands and the commutation of the forestal rights, a great portion of the land could not be cultivated to advantage or improved. The practice of leaving the land in grass for several years, and then breaking it up for a course of cropping, prevailed in most parts of the county, and, being better regulated, has introduced a modified convertible system, to which the lighter soils are well adapted. Turnips are cultivated to a great extent. Along the river Trent are some very good meadows and pastures, in which bullocks are grazed to advantage.

There are many hop plantations in the county, which in some years give a good profit to the grower. There are excellent market-gardens in the neighbourhood of Newark, Nottingham, and other towns, the sandy soil being very favourable to the cultivation of roots and vegetables. There are some good orchards on the heavier soils.

Divisions and Towns.—Nottinghamshire is divided into 6 wapentakes. It is in the diocese of Lincoln. It is in the Midland circuit, and the assizes are held at Nottingham. For parliamentary purposes, it is divided into North and South Nottinghamshire. Each division returns 2 members; and 2 members are returned respectively for the boroughs of Nottingham and Newark, and the hundred of Bassetlaw (which includes East Retford), making 10 members in all.

The following are the principal towns, with the population of each in 1841:—

Bingham is a market-town 9 miles E. from Nottingham. The town consists chiefly of two parallel streets, and has a large market-place. Population of the township, 1989.

Mansfield, a market-town, 13 miles N. by W. from Nottingham, is situated in a valley near the little river Mann or Maun, and is surrounded by the ancient forest of Sherwood. It contains a commodious parish church, a free grammar-school, and a union workhouse. Population of the parish, including the hamlet of Pleasley-Hill, 9788.

Newark-upon-Trent, a market-town, municipal borough, and parliamentary borough, 17 miles N.E. from Nottingham, is situated on the eastern bank of a branch of the Trent, which, about two miles S. of the town, divides into two channels, and about two miles N. of the town unite again, thus forming a river-island, on which are the ruins of the ancient castle of Newark. The town extends about a mile along the bank of the river, and consists of several streets, with a market-place in the centre of the town. It contains a handsome town-hall, a court-house, a very large parish church of very elegant perpendicular architecture, several places of worship for dissenters, a free grammar school, and various other schools. The municipal borough is divided into 3 wards, and is governed by 6 aldermen and 18 councillors. Population, 10,229. The municipal borough is coincident with the parliamentary borough, which returns 2 members.

Nottingham, a municipal borough, parliamentary borough, and the county town of Nottinghamshire, 130 miles N.N.W. from London by the Midland Railway, is situated on the north bank of the river Lene, about one mile N. from the Trent. The town stands on a slope, and consists of a number of streets irregularly laid out, but well paved and lighted with gas. The castle stands on the summit of the hill. The market-place is very large, and surrounded with lofty buildings. The Nottingham Canal passes close to the town, and joins the Trent at Trent Bridge, a mile distant. There are several bridges in the town over the arms of the Lene. The principal public buildings are—the New Exchange, the

County Hall, a small theatre, 3 parish churches, 3 or 4 other churches, and several places of worship for dissenters. There are several charitable institutions, and numerous schools. The principal manufactures are bobbin-net and lace, and cotton and silk stockings. The municipal borough is divided into 7 wards, and is governed by 14 aldermen and 42 councillors. Population, 53,091. The parliamentary borough returns 2 members. Population, 51,441.

Ollerton, a market-town, 18¼ miles N. by E. from Nottingham, is situated on the banks of the Mann, or Maun; it has a neat gothic chapel of modern erection. Population of the chapelry, 777.

Retford, East, a market-town and municipal borough, 26 miles N.N.E. from Nottingham, is situated on the east bank of the river Idle. The village of West Retford is connected with East Retford by a bridge. The town consists of several streets, well paved, and lighted with gas. It contains a town-hall, theatre, news-room, and a large and handsome parish church of various styles of architecture. The parliamentary borough of East Retford is now included in that of the hundred of Bassetlaw. The municipal borough is governed by 4 aldermen and 12 councillors. Population, 2680. Population of the parliamentary district of Bassetlaw, 44,132.

Southwell, a market-town, 12 miles S.E. from Nottingham, is situated on an eminence near the small river Greet, and consists of well-built houses and well-paved streets. The collegiate church is a large and magnificent cruciform building. The nave and western transept are of Norman architecture. The extreme length of the church is 306 feet; the breadth of the nave and aisles, 59 feet. The choir and eastern transept are of early English character; the chapter-house, decorated English of an early period. The town contains assembly-rooms, theatre, and the county house of correction. A branch of the Nottingham and Lincoln Railway connects Southwell with Nottingham. Population of the parish, 3487.

Sutton in Ashfield, a village, 3¼ miles S.W. from Mansfield, is situated on an eminence, and consists of several streets. Population of the parish, 6557.

Tuxford, a market town, 22 miles N.N.E. from Nottingham, has a modern appearance, having been rebuilt after a great fire in 1702. The principal trade is derived from the cultivation of hops in the neighbourhood. The church exhibits a mixture of various styles. Population of the parish, 1079.

Worksop, a market-town, 26 miles N. from Nottingham, is situated in a valley near the river Rayton. It consists of one long principal street, with another branching from it at right angles. There is a moot-hall, an ancient building, for the public business of the town. The church is part of that which formerly belonged to a priory of canons of St. Augustin, founded here in the time of Henry I. Population of the parish, 4025.

History, Antiquities, &c. — In the earliest period of British history the county seems to have been included in the territory of the Coritani. In the division of the island by the Romans, the county was included in the province of Flavia Cæsariensis.

Many Roman remains have been discovered near Newark. But the most remarkable discovery was that of the foundations of a Roman villa at Mansfield Woodhouse, in 1786. The pavement and other antiquities found are minutely described by Major Rooke, the discoverer, in the 8th volume of the 'Archæologia.'

After the Conquest, the greater part of the county, together with the castle of Nottingham, was bestowed by William the Conqueror on his natural son, William Peverel. At the commencement of the civil war of Charles I. the king set up his standard at Nottingham with great ceremony in 1642. Monk with his army marched through Nottinghamshire, passing through Mansfield, Southwell, and Nottingham in his way southward in 1660 to restore the king.

Of architectural antiquities Nottinghamshire is somewhat barren. Of the monastic ruins the most beautiful are those of Newstead. Here was a priory of Black or Austin Canons, founded by Henry II. about 1170.

NOUN, the name of one of the parts of speech into which grammarians have distributed the words of a language. The noun generally expresses the subject of discourse, or the name (*nomen*) of the thing spoken of, as *horse, table, darkness*, &c.; but it may also be used as the predicate, as in the sentence, 'Tin is a metal,' where both 'tin' and 'metal' are nouns.

So far as respects the form of nouns, that is, the sounds of which they are composed, they are capable of classification in all languages. The nature of this classification may be explained from examples in our own language. Many nouns are simple roots, as *horse, ship, man, tree*; while others are formed by adding a suffix to the root or to other words, as *build, build-er; king, king-dom*, and so forth.

NOUREDDIN (*Malek-al-Adel Noor-ed-Deen Mahmood*), one of the Moslem rulers of Syria in the age of the Crusades, born A.D. 1117, A.H. 511, was a younger son of Amad-ed-Deen Zenghi, the second of the dynasty of the Atabeks of Irak and Syria. At the death of his father, who was murdered by his own Mamelukes at the siege of Jabbar, 1146, Noor-ed-Deen secured the possession of Aleppo and of his father's Syrian dominions; while Mesopotamia, with Mosul, fell to the lot of the elder brother Seif-ed-Deen. Noor-ed-Deen continued the Holy War against the Crusaders, whom he drove from Palestine. He then invaded Antioch, and in a pitched battle (1149) Prince Raymond was killed. This success was followed by the capture of Josceline de Courtenay, who died in confinement, while Edessa and its dependencies fell almost without resistance into the power of Noor-ed-Deen, whose dominions now included the whole of Northern Syria. Modjir-ed-Deen was still the nominal ruler of Damascus and the southern portion; but the inhabitants, dreading an attack from the Christians, offered their allegiance to Noor-ed-Deen (1154) as the price of his protection. Noor-ed-Deen fixed his capital at Damascus, which he adorned with mosques, fountains, colleges, and

hospitals. Several years of continual but varied warfare against the Christians followed the union of all the Moslem power of Syria under a single head; and the sway of Noor-ed-Deen was from time to time enlarged by acquisitions, not only from the enemies of Islam, but from the sultan of Iconium and the minor Moslem princes of Mesopotamia. The state of affairs in Egypt, where the Fatimide caliphate was now tottering to its fall, opened a wider field of ambition to both the Christian and Moslem rulers of Syria. Noor-ed-Deen took advantage of this state of affairs, sent an army into Egypt in 1163, under his general Shirkoh, who succeeded in establishing himself in 1168 as lieutenant of Egypt under Noor-ed-deen; but dying the same year, he was succeeded by his famous nephew Salah-ed-Deen (Saladin).

Noor-ed-Deen pushed his successes in Syria against the Christians; and the fleets of Damietta and Alexandria were directed against the sea-coast of the kingdom of Jerusalem. But a religious conquest was yet wanting to complete his triumph: through his agency the Sheah heresy was for ever abrogated in Egypt; Noor-ed-Deen, as the champion of orthodoxy, received from Mostadhi the direct investiture of Egypt and Syria as fiefs of the caliphate, and exchanged the title of Emir, or Sahib, for the higher appellation of Sultan. But the ambition of Salah-ed-Deen, who, though acting ostensibly as his lieutenant in Egypt, had in fact made himself independent, induced the sultan to prepare to march into Egypt against his refractory vassal, when he died at Damascus, May 26, 1173.

NOUREDDIN (*Malek-al-Afdal Noor-ed-Deen Ali*), the eldest of the 17 sons of Salah-ed-Deen, was born in 1170. In the partition of his father's extensive dominions, which followed his death in 1193, Damascus and Southern Syria with Palestine fell to his lot; but he was stripped of his kingdom by his uncle Seif-ed-Deen Abubekr (the Saphadin of Christian writers), and his brother Othman, sultan of Egypt (1196). In 1198 Noor-ed-Deen retired to Samosata, where he died, 1224.

NOUREDDIN, or *Noor-ed-Deen Arslan*, Shah, Atabek, or prince, of Mosul and Mesopotamia, of the family of Zenghi, and grand-nephew of Noor-ed-Deen, sultan of Aleppo and Damascus, succeeded his father, Azz-ed-Deen Massood, 1193. During a reign of 18 years he re-established in some measure the declining power of his house. He died 1210.

NOVA SCOTIA, a British colony in North America, is situated between 43° 20′ and 46° N. lat., and between 61° and 66° 20′ W. long. It is surrounded by the sea, except at its north-western extremity, where the isthmus of Chignecto unites it to New Brunswick. On the west side of Nova Scotia is the Bay of Fundy; on the south and east the Atlantic; on the north it is divided from the island of Cape Breton by the Gut of Canso; and from Prince Edward's Island by Northumberland Strait. Its extreme length is 280 miles, and breadth 100 miles. The area is about 16,000 square miles.

Coast; Surface; and Rivers.—Along the shores of the Atlantic, from Cape Canso to Cape Sable, the coast is rocky and rather high, though steep cliffs rarely occur; and there are many inlets which form safe harbours. The remainder of the coast exhibits an alternation of high and low ground.

The lowest depression of the country seems to occur about 63° 30′ W. long. The country to the west of that depression may perhaps on an average be about 300 feet above the sea-level. Its surface, though far from being level, does not appear to present any great inequalities, and has a hilly character only in that part where it descends towards the west, north, and east. The tract along the southern coast, and for several miles inland, is generally naked and barren, the soil being occupied by rocks and stones: in some places it is covered with low trees and bushes, but in general it is unfit for cultivation. The country surrounding Mines Bay is the most fertile and the best-settled portion of Nova Scotia. The country to the eastward of the depression resembles in most respects the western, constituting in the interior a table-land, from 200 to 300 feet above the level of the sea, and with a slightly irregular surface. It contains rich mines of coal and iron. These advantages, united to a very profitable fishery, and the vast forests of timber-trees, give great prospective value to the country.

The number of rivers is very great, but their course is short. Nearly all of them form good harbours at their mouths, though they are generally only fit for moderate-sized vessels. Most of the rivers have rapids not far from the sea, which however do not prevent them from being used to float down the timber from the interior. The most remarkable are the Annapolis River and the Shubenacadie.

Climate and Productions.—The climate is colder than that of England, but it varies considerably in the different parts of the country. Along the southern and western coast there are several harbours which are never frozen; but the harbour of Pictou, on Northumberland Strait, is usually closed by ice for four months. The climate is everywhere very healthy.

Wheat and Indian corn are grown, but not in large quantities. Rye, oats, barley, and potatoes are the principal articles which are raised. Turnips, beans, and buckwheat are also generally cultivated. Herbage and fruits are plentiful.

Cattle and sheep are very numerous. Beef and butter make a considerable article of export. Horses are not numerous, and the breed is indifferent. Hogs are tolerably numerous.

The forests are one of the sources of the wealth of the country; they consist of pine, birch, oak, hemlock, beech, ash, maple, and elm: there are other trees of great beauty, but less value. The wild animals are the moose-deer, bear, tiger-cat, fox, marten, otter, mink, beaver, musk-rat, porcupine, racoon, weasel, squirrel, and hare. The lakes and rivers abound with fish.

The eastern portion of Nova Scotia is very rich in minerals. Coal and iron are abundant. Indications of copper and lead occur along Northumberland Strait. Gypsum, salt, slate, and freestone are met with in considerable quantities.

Population and Towns.—The population of Nova Scotia is 178,237. The colony is divided into 9 counties.

The population of the colony is of a mixed character. It consists of four distinct classes: the Indians, or aborigines; the free negroes; the Acadians, descendants of the French, by whom the country was partially settled before its conquest by the English; and colonists from the United Kingdom and Germany. The Acadians are Roman Catholics; they settle together as much as possible, preserve their religion, language, and customs, and never intermarry with their Protestant neighbours.

Halifax, the capital of the province, in 44° 40′ N. lat., and 63° 38′ W. long., is built on the declivity of a hill, the summit of which is 240 feet above the sea. It stands at the western side of the harbour, which is very spacious, safe, and accessible at all seasons. The town is regularly laid out, and the streets are for the most part paved or macadamised. Including the suburbs, the town is two miles long and half a mile broad; it contains several places of worship. The Providence Building, in the centre of the town, is a handsome well-built edifice of freestone, 140 feet long, 70 feet wide, and 42 feet high. The court-house, in which the Courts of Common Pleas and the Sessions of the Peace are held, is a plain brick building. Halifax is the principal naval station in British America, and in time of war its possession is of great importance: it contains a well-appointed naval arsenal. It is the seat of government for the province, and carries on a large trade with the United Kingdom, the West Indian Colonies, and the United States. Population, about 25,000.

Opposite to Halifax, on the eastern side of the harbour, is the small town of *Dartmouth*.

Amherst stands near the isthmus which divides the Bay of Fundy from Northumberland Strait. It is a small but thriving place.

Annapolis stands on a peninsula which projects into the Gut of Digby. It was the capital of the province under the French, who called it *Port Royal*.

Chester is a thriving town on the north side of Mahon Bay, about 9 miles from its entrance. It contains several saw, grist, and fulling mills, and carries on a considerable lumber trade.

Dorchester is situated a mile above the navigation on the river Antigonish. It has a considerable trade in proportion to its size, and contains a court-house, a Baptist, a Presbyterian, and a Roman Catholic chapel.

Guysborough stands on the western side of Milford Haven, at the head of Chedabucto Bay. It contains a court-house, an Episcopal church, Roman Catholic and Protestant Dissenters' chapels.

Liverpool stands on the west side of Liverpool Harbour. The inhabitants are mostly engaged in the lumber trade and fishery. The harbour is never frozen, and is accessible at all seasons.

Lunenberg, on Lunenberg Bay, is a regularly-built town, with four churches and chapels. It carries on the lumber trade with the West India Colonies.

Pictou, on Northumberland Strait, has a considerable trade in coal and lumber, and a capacious harbour.

Shelburne was built by American loyalists immediately after the recognition of the independence of the United States. It has a harbour, and soon rose to importance; but has since greatly declined.

Truro, a town mostly built of wood, stands at the head of Mines Bay. It contains a church and a court-house.

Windsor stands at the confluence of the St. Croix and the Avon, about 40 miles N. from Halifax. It contains a college, an academy, an Episcopal church, a Roman Catholic chapel, and places of worship for many sects of Protestant Dissenters.

Yarmouth, on the west coast of the province, consists of one street nearly two miles long, but the dwellings are not placed close together.

The affairs of the province are administered by a lieutenant-governor, subordinate to the governor-general of British North America, a council of 12 members appointed by the crown, and a house of assembly, consisting of 41 members, elected by forty-shilling freeholders. The bishop of Nova Scotia and the chief-justice of the province are ex-officio members of the council.

The exports of the province consist principally of lumber and the produce of the fisheries. The imports are chiefly of British manufactured goods and West India produce.

NOVA ZEMBLA, a corruption of the Russian name of Novaïa Zemlïa (new land), designates an island situated in the Arctic Ocean, between 70½° and 76½° N. lat., and 52° and 66° E. long. It is about 400 miles long, with an average width of 50 miles. It is divided from the island of Waigatz, which lies farther south, by the Strait of Kara, which is more than 30 miles wide. Zembla properly consists of several islands; but their relation one to another is not well known.

The land on the western side of the island is mountainous, rising from a steep and bold shore to the height of 1000 and 2000 feet. The most elevated mountain is on the strait itself, and is 3475 feet high. The eastern shores are comparatively level, especially towards the south. The vegetation, which covers some parts of the surface, consists only of lichens and mosses.

Nova Zembla first became known by the voyage of Burough (1556), but had previously been visited by the Russians. The Russian government in recent times has sent several expeditions to explore the islands, but they have not yet completely succeeded in this object.

NOVA'LIS, the literary name assumed by Friedrich von Hardenberg, was born in 1772, at a family estate in Mansfeld. His father, Baron von Hardenberg, had been a soldier in his youth, and was director of the Saxon salt-works. Novalis was very delicate in his earlier years. He displayed no extraordinary talent, till a dangerous illness in his 9th year awoke him from a kind of intellectual slumber, and he appeared thenceforward an intelligent child. In 1789 he attended a gymnasium, and in the following year went to study at Jena, where he remained till 1792, when he went with his brother Erasmus to the university of Leipzig. In the succeeding year he re-

moved to Wittenberg, where his studies were completed.

On leaving Wittenberg he went to Arnstadt, where he became enamoured of a lady, called by his biographer Sophia von K. In 1795 he went to Weissenfels, and was made auditor of the department of which his father was director. The death of Sophia and of his brother Erasmus, both in the year 1797, was a great shock to Novalis; he however pursued his business with activity, and it is about this time that his 'Hymns to Night' are supposed to have been written. In 1798 he was betrothed to a lady called Julia von Ch., and about this time he wrote his 'Pupils at Sais.' In 1800 the romance 'Heinrich von Oefterdingen' was commenced by Novalis. This singular work was never finished. He now fell into a weak state. The books which he studied were the Bible, and the works of Zinzendorf and Lavater. He loved to talk of his projected works, and professed that he now for the first time knew what poesy was, and designed to re-write 'Oefterdingen.' He died March 19, 1801, before he had completed his 29th year.

The whole works of Novalis were collected and edited by his friends Tieck and F. Schlegel, with a biography prefixed by the former. The edition has been reprinted at Paris, in 1 vol. 8vo.

NOVARA, a division of the Sardinian states, is bounded E. by the Ticino and the Lago-Maggiore, which separate it from Lombardy, S. by the Po, W. by the provinces of Torino and Aosta, and N. by the Lepontian Alps and Switzerland. The portion of the division extending northwards from the spur of Monte-Rosa that runs round the lake of Orta forms the *Province of Pallanza*, and is covered by the main ridge of the Alps which inclose a long valley, watered by the Toccia or Tosa, and assuming different names at different points of its length. Into this valley numerous lateral ones open, each adding its tributary stream to the Toccia, to be by it conveyed into the Lago-Maggiore. The largest of these lateral valleys is the Val Macugnaga watered by the Anza, which flows eastward into the Toccia from Monte-Rosa. The Simplon road across the Alps enters Italy by that part of the valley of the Toccia called the Val-d'Ossola. The province of Pallanza produces but little corn; the high valleys and lower slopes of the mountains afford pasture for great numbers of horned cattle and numerous flocks of sheep and goats. In favourable situations and in the lower valleys the grape flourishes. Chestnuts and filberts are abundant. Some iron and copper mines are worked. The inhabitants are poor, and some of them annually emigrate to the neighbouring countries chiefly as stone-masons.

The *Province of Novara* extends southwards from that of Pallanza to a line running nearly E. from the Sesia above Vercelli to the Ticino. It is hilly in the north about the lake of Orta; but the central and southern portions are level, forming part of the great plain of the Po. The soil is rich and very productive in corn, rice, hemp, maize, pulse, and silk. Pasture is good, especially in the north. Pigs and poultry are very abundant. The chief rivers are the Sesia and the Ticino, between which the province lies; the central part of the plain is drained by the Agogna and the Terdopio, which in their lower courses traverse the Lomellina, and ultimately enter the Po from the left bank. Numerous canals for irrigating the rice grounds are derived from these rivers.

The *Lomellina*, or *Province of Mortara*, lies S. of the province of Novara between the Sesia, the Ticino, and the Po. The Ticino is navigable from the Lago-Maggiore to its entrance into the Po. The other streams are the Terdopio and the Agogna, which traverse it from N. to S. The country is level; the productions similar to those of the preceding province.

The *Province of Vercelli* forms the most western part of the division, and comprises all that part of it which lies W. of the Sesia, including the district called *Val-Sesia*. It is drained by the Sesia, the Po, and partially by the Dora-Baltea, which is joined to the Sesia by a canal that runs by the town of Santhia. The interior is traversed by the Cervo and the Elvo, feeders of the Sesia. The Val-sesia, which forms the north of the province, is covered by ramifications of the Alps. Except in the valleys, the climate, like that of Pallanza, is cold. Some rye, millet, a little maize, and chestnuts, are the chief productions. In favourable situations the vine and the mulberry are cultivated. The chief wealth of the country consists in its cattle, butter, and cheese. In the south, the province of Vercelli is mostly a flat country, productive in rice, wheat, maize, oats, hemp, wine, and silk. The rice-grounds, which are laid under water until the rice is ripe in September, both here and all through the valley of the Po, are very unhealthy; but the undulating and high lands to the northward are exceedingly salubrious, and the aspect of the country extremely varied and picturesque.

The area, population, and sub-divisions of the provinces of the division of Novara are as follows:—

Provinces.	Area in sq. Miles.	Mandamenti.	Pop. in 1839.
Novara . . .	792	16	186,159
Lomellina, or Mortara . .	480	14	133,016
Pallanza . .	871	10	95,598
Vercelli . .	549	13	127,955
Total . .	2692	53	542,728

Towns.—The province of Novara is named from its chief town *Novara*, an old, irregularly built, but strongly fortified town, which is situated 50 miles N.E. from Turin, and 10 from the left bank of the Ticino, on the high road from Milan to Turin, and has a population of 19,419. It gives title to a bishop, and has an ecclesiastical college, a gymnasium, two hospitals, a public library, and a considerable trade in silk and agricultural produce. Some of the churches, convents, and the palaces of the nobility are handsome structures. The total defeat of the Sardinian army near this town by the Austrians under Marshal Radetzky (March 23, 1849) led to the abdication of the Sardinian

King Carlo Alberto, and to the renunciation on the part of Sardinia of all claim to the sovereignty of Lombardy. ARONA. *Borgomanero*, 19 miles N. from Novara, on the left bank of the Agogna, is a well-built bustling town, with 7095 inhabitants. *Galliate*, situated near Novara, has 5858 inhabitants, including the commune. *Oleggio*, near the right bank of the Ticino N. of Novara, has a population of 7420. *Trecate*, on the road from Novara to Vigevano, has a population of 5071: Varallo, the chief town in the Val-sesia, stands on the left bank of the Sesia, and has a population of 2807.

In the Lomellina, the chief towns are—*Mortara*, the capital, which stands 46 miles S. by E. from Novara in an unhealthy situation among the irrigated rice-grounds; it is surrounded by walls, and has a population of 5316: *Gambolò*, on the left bank of the Terdopio, 5 miles E. from Mortara; population 5075: *Garlasco*, W.S.W. of Mortara; population 5436: *Mede*, population 4415: *Sannazzaro*, with 3980 inhabitants: and *Vigevano*, a large well-built walled town, which gives title to a bishop, and has 15,221 inhabitants, who trade in the produce of the country, and manufacture silk, soap, gauze, hats, and macaroni. Vigevano is 16 miles S.E. from Novara, about a mile and a half from the right bank of the Ticino, and on the southern road from Milan to Turin.

In the province of Pallanza the principal towns are—*Pallanza*, a small place of 2044 inhabitants on the shore of the Lago-Maggiore, with a college and the provincial courts: *Intra*, a little N.E. of Pallanza, which has 3743 inhabitants: *Cannobbio*, several miles higher up the lake, population 2137: and *Domo d'Ossola*, a well-built cheerful little town of 2025 inhabitants, situated in a beautiful part of the valley of the Toccia. At Domo-d'Ossola, the traveller who crosses the Alps from Switzerland by the Simplon road, first receives his impression of the Italian sky, scenery, and manners.

The province of Vercelli takes its name from *Vercelli* its capital, which is situated on the right bank of the Sesia, 16 miles S.W. from Novara, on the high road to Turin, and has 18,353 inhabitants. The town, which gives title to a bishop, has a cathedral and several other handsome churches, a good town-house, a gymnasium, an ecclesiastical college, a large hospital with a botanical garden, and an anatomical museum attached to it. The market-place is a vast square surrounded by good buildings. The Milan gate of the town is worth notice on account of its architecture. The principal article in the commerce of Vercelli is rice, which is grown in large quantities in the surrounding plains. Vercelli is an unhealthy place. The other towns are—*Cigliano*, W. of Vercelli, near the Dora-Baltea, which has 4473 inhabitants: *Gattinara*, 20 miles N. from Vercelli, on the right bank of the Sesia, in a good wine district; population 4701: *Crescentino*, S. of Cigliano, near the left bank of the Po, with 5547 inhabitants: *Santhia*, 13 miles W. from Vercelli, population 4174: and *Trino*, in a low marshy district on the left bank of the Po, which has 8217 inhabitants, who trade largely in hams, cattle, and pigs.

(*Nuova Circoscrizione delle Provincie dei Regii Stati in Terraferma*, Torino, 1839.)

NOVATIANS, a Christian sect which arose in the middle of the 3rd century. Their leader Novatianus was a presbyter at Rome, who, after the death of Fabian, bishop of Rome (250), refused to submit to the authority of Cornelius, his successor, and procured his own ordination as bishop of Rome. Upon this Cornelius called a council at Rome, and excommunicated Novatian and his adherents, who immediately formed a distinct sect, and thus became schismatics. But Novatian is also reckoned as a heretic, on account of his opinions respecting those Christians who after baptism had fallen into open sin, whom he declared that the church had not the power to admit again to her communion. This sect declined in importance during the 5th century.

Novatian wrote several works, among which are a treatise, 'Of Jewish Meats;' another, 'Of the Trinity,' or 'Of the Rule of Faith.' The Novatians asserted that their leader suffered martyrdom, but of this we have no proof.

NOVELLÆ. [JUSTINIAN'S LEGISLATION.]

NOVEMBER, the eleventh month of the Julian year, was the ninth in the year of Romulus, whence it received its name. It originally consisted of 30 days, which were continued by Romulus and Numa. Julius Cæsar gave it another day, but Augustus reduced it again to 30, and this number it has ever since retained.

Our Saxon ancestors called November *Blot-monath* (blood-month), the month of sacrifice, because at this season the heathen Saxons made a provision for winter, and offered in sacrifice many of the animals which were then killed.

NOVI. [GENOA.]

NOVICE, the appellation given to persons of either sex, who are living in a monastery in a state of probation previous to becoming professed members of a monastic order. The period of the noviciate must not be less than one year, and the person who enters as a novice must have attained the age of puberty. The council of Trent, session 25, can. 17, prescribed that female novices, after the expiration of their noviciate, should return to their friends, and be examined by the bishop of the diocese, in order to ascertain that they were under no constraint or deception, that they were fully aware of the duties and privations of the monastic life, and that they voluntarily chose to enter it. These precautions however have been neglected in many instances.

NOVIKOV, NIKOLAI IVANOVITCH, was born April 27, 1744, at Tikhvensk, near Moscow. At the age of 18 he entered the government service, and then first began to apply himself to study. One of his first literary productions was his 'Zhivopisetz' (the Painter), a work somewhat on the plan of the 'Spectator.' He shortly afterwards published his 'Opuit' (Specimen or Essay of a Lexicon of Russian Authors). These works procured him the notice of the Empress Catherine, and he soon after settled at Moscow, where he established a Typographical Society, having for its object the printing of useful books at a cheap rate, and diffusing them through the empire. He also set up the first circulating library; and did much to improve the character and increase the

sale of journals and other periodicals. Neither was his attention confined to such improvements, for he helped to introduce many into the system of school-education. His activity and that of his associates was however looked upon with suspicion by the government; the society was broken up, and Novikov received a command to retire to a distant province. After the Emperor Paul's accession he was permitted to return, but he lived in retirement upon his estate at Tikhvensk, where he died, July 31 (Aug. 11), 1818.

NOVOGOROD, one of the eight governments of Great Russia, derives its name from its capital, which was formerly the residence of the most powerful of the Russian grand-dukes, whose dominions, included also the present governments of Olonez, Pskow, Twer, and part of that of St. Petersburg. The government in its present limits extends from 57° 18′ to 61° 8′ N. lat., and from 30° 10′ to 39° 40′ E. long. It is bounded by the governments just named. The area, according to Schubert, is 54,100 square miles. It is divided into ten circles, and the population in 1846 was 907,900.

Part of this government is traversed by the Waldai Hills, which run through this government and Twer, and are probably in no part more than 300 feet high. The face of the country is diversified with hills, rivers, high banks, plains, valleys, marshes, and lakes. The northern part is low and swampy, and for the most part covered only with peat. In the southern part the soil is clayey or sandy, and in some places there is a black mould. There are fine pastures, and the agricultural produce amply repays the labour of the husbandman.

The principal rivers are the Msta, which comes from Twer, and the Wolchow. These two rivers, which are connected by Lake Ilmen, complete the great water-communication between the Wolga and the Neva. The other chief rivers are—the Lovat, the Pola, and the Schelen, all of which fall into Lake Ilmen; the Schekona and the Wologa, which joins the Wolga; and the Sias and the Buscha, which run into Lake Ladoga. The government contains 42 rivers, and 3 large and 55 smaller lakes.

Agriculture is the chief occupation of the inhabitants. The chief agricultural products are rye, barley, oats, buckwheat, and great quantities of peas; with a variety of vegetables. The country is covered with thick forests, and timber is a great staple article of the government. Owing to the length of the winter, the breeding of cattle is limited to what is necessary for the purposes of agriculture. The horses, oxen, and sheep are of the common Russian breeds; few swine and goats are kept. The fisheries on the lakes and rivers are extremely productive. The mineral products are iron, freestone, coals, slate, salt, clay, lime, and marl.

There are no manufactories of any importance on a large scale. The export trade of the province is confined to its own productions, corn, hemp, flax, salt, some iron, a great quantity of timber, some furs, hides, leather, and forage, most of which goes to St. Petersburg.

The great majority of the inhabitants are Russians, with a few families of Finns, and in the towns some Germans. The predominant religion is the Greek; many of the Finns are Lutherans.

Novogorod, the capital, is situated in 58° 32′ N. lat., and in 31° 20′ E. long., on the banks of the Wolchow. The city consists of three parts: the fortress, standing on a steep hill on the north side of the river, surrounded with thick walls and towers; and on the south of the river the commercial town and the Sophienstadt (St. Sophia's Town), which are connected with the fortress by a handsome stone bridge. This city is one of the most ancient in the Russian empire; but its importance was diminished when St. Petersburg was selected as the imperial capital. It consists principally of scattered groups of mean houses, separated by ruins or by fields formerly built upon, and its population does not exceed 10,000. The principal church is the cathedral, dedicated to St. Sophia; there are upwards of 60 other churches. The other buildings are—three monasteries, a fine bazaar, a new palace, a poor-house, and an orphan-school. There are several elementary schools and a Bible Society, a considerable sail-cloth manufactory, tanneries, and soap and candle manufactories.

Other towns in the government of Novogorod are—Staraja-Russa, on the Polista, with 5600 inhabitants, and considerable salt-works; Waldai, on the Waldai lake, with 3200 inhabitants; Tichwin, on the Tichwinke, with 4100 inhabitants; Kirdow, with 2500 inhabitants; Belosersk, on the Scheksna; Sominа, on the river of the same name, with 5000 inhabitants; and Ustjushna, or Schelesopolskaja, in a country abounding in iron; the inhabitants, 2500 in number, have considerable trade in iron and timber. All the above towns are capitals of circles of the same names.

NOWANNUGGUR. [HINDUSTAN, vii., 205.]

NOY, WILLIAM, a lawyer, 'was,' says Fuller, 'for many years the stoutest champion of the subjects' liberty, until King Charles entertained him to be his attorney.' He was made Attorney-General on 31st October, 1631. Noy was a profound lawyer and juridical antiquary; but, as Clarendon says, 'he could not give a clearer testimony that his knowledge in the law was greater than all other men's than by making that law which all other men believed not to be so.' It was to his researches in the older constitution, conducted in this perverse spirit, that the court owed the project of ship-money. Noy drew the writ for levying this illegal tax, but he did not live to see the momentous effects of his exertions, and died on 6th August, 1634. Noy was the author of several legal works, which seem generally to have been published posthumously. Among these are 'A Treatise of the Principal Grounds and Maximes of the Lawes of England,' 4to., 1641, which has passed through several editions; 'The Compleat Lawyer; or a Treatise concerning Tenures and Estates in Land of Inheritance for Life, and other Hereditaments and Chattels, real and personal; together with Observations on the Author's Life,' 1674, 8vo.; 'A Treatise on the Rights of the Crown; declaring

how the King of England may support and increase his Annual Revenues,' 1715, 8vo. He collected 'Reports and Cases taken at the time of Queen Elizabeth, King James, and King Charles,' 1669, folio.

NOYON. [OISE.]

NOZAY. [LOIRE-INFE'RIEURE.]

NUBIA, a general and rather vague denomination, which is often used to designate a vast extent of country stretching along the banks of the Nile from the southern borders of Egypt to the frontiers of Abyssinia and Sennaar. The extent of information possessed by the ancients concerning those regions is stated under ETHIOPIA.

The Nubæ, or Nubatæ, are mentioned as a nation bordering on Egypt in the time of Diocletian. In subsequent centuries however, a kingdom of the Noubas was formed, of which Dongola was the capital. The country appears to have continued to profess Christianity, and to have retained its independence till the 13th century of our æra. Soon after the invasion of Egypt by the Caliph Omar, a Saracen army advanced to Dongola, and obliged Koleydozo, the king of the Noubas, to agree to pay an annual bakt, or tribute, of 360 head of slaves. This agreement was maintained with little interruption for more than five centuries. During the 14th century, repeated contests took place between the kings of Nubia and the sultans of Egypt. After that time little is known of the history of Nubia; but it seems that the power of the kings of Dongola being broken, the country became divided into various petty states, while fresh immigrations of Bedouin Arabs took place, and Christianity became gradually extinct in all the countries between Egypt and Abyssinia.

The Noubas and Kenous are black or nearly so, but have not the negro features nor woolly hair. Many of them have the peculiar style of countenance which is often seen in the sculptures of the Egyptian temples.

Shendy is the principal place in the country of Atbara, the ancient island of Meroe. The interior of this vast country is little known; it is nominally divided between the states of Shendy and Halfay, which is to the south of the former, the two maleks or chiefs of which are said to be able to bring into the field 30,000 horsemen.

The town of Shendy, the capital of the country, about half a mile from the east bank of the Nile, contains about 6000 inhabitants. The streets are wide, and the houses are low, but well built of clay. There are market-places, where, besides meat, fowls, liquid butter, grain, and vegetables, spices from Jidda, gum Arabic, and beads and other ornaments for the women, are sold. Great numbers of slaves from Abyssinia, Sennaar, and Darfur are purchased.

There is another town on the opposite or western bank of the Nile, called Shendy el Gharb (Shendy on the west), which is also well built, and contains about 6000 inhabitants. It has three market-places, where the people of the country exchange dourra for other provisions and goods.

Many Arab tribes inhabit the territory of Shendy, the great part of whom still lead the Bedouin life. The merchants of the town, and especially the brokers, are mostly foreign settlers from Dongola, Sennaar, Darfur, and Kordofan.

Not far from eastern Shendy, to the northwards near a village called Assour, or Hatchour, are a number of tarabyls, or pyramids, the largest of which is about sixty feet high; and there are in various parts of the country numerous other remains of antiquity.

Halfay, which lies south of Shendy, and between it and Sennaar, is a less important state. The head town, of the same name, lies above the confluence of the White River and Blue River, and on the east bank of the latter, in about 15° 40′ N. lat.

The monuments of Lower Nubia have been described by Gau, Burckhardt, Belzoni, Wilkinson, and others. The most remarkable are the temples of Abousambul, Dandour, and Soleb. The monuments of Upper Nubia and of Meroe have been described by Waddington, Cailliaud, and Rüppel.

NUCIFRAGA. [CORVIDÆ.]

NUCLEOBRANCHIA'TA, M. de Blainville's name for his fifth order of his second section of his second subclass (*Paracephalophora Monoica*).

M. Rang, who has illustrated the anatomy of some of the families, makes the *Nucleobranchiata*, in his arrangement, the first order of Cuvier's class *Gasteropoda*, and comprises under it some of the *Heteropoda* of Lamarck and the family *Pterotrachées* of De Férussac.

The following character of the order is given by M. Rang:—Animal furnished with a foot compressed into the form of a fin, with an acetabulum or sucker on its superior border. Branchiæ pectinated. Both sexes comprised in the same individual. Often a shell, which is spiral, has a very large aperture, and is vitreous and very fragile. An operculum sometimes.

Examples, *Firola*, *Alenta*, *Carinaria*, &c. [GASTEROPODA (5, *Les Heteropodes*); CARINARIA.]

NUCLEUS, a term first given to the central part of a comet, and thence to the central part of any appearance which is transparent towards the extremities and opaque towards the centre.

NU'CLEUS is a botanical term strictly signifying the central succulent part of an ovule, in which the embryo plant is generated. It has also been applied to the point, or circle, visible on the side of a cell of cellular tissue, from which the cell itself is supposed to have been developed, and which has of late years been named cytoblast.

NUDIBRANCHIA'TA, Cuvier's name for his second order of *Gasteropoda*, which he characterises as having no shell nor any pulmonary cavity, but naked branchiæ on some part of the back. They are all hermaphrodite and marine. They often swim in an inverted position, with the foot at the surface concave, like a boat, aiding themselves with their mantle and tentacula as oars. M. Rang gives the following definition of the order, which he makes to consist of the following groups—*Tritonians* of Lamarck, *Polybranchiata* and *Cyclobranchiata* of De Blainville.

Animal furnished with a foot for creeping, and

naked branchiæ on some part of the back, which are always symmetrical, whether they are found on the median line or occupy the sides of it; one or more pair of tentacles; hermaphrodite.

The last-named author also describes the order as consisting entirely of marine and hermaphroditic animals, some of them inhabiting the banks and creeping by means of their considerably sized foot, and others the deep sea, where they attach themselves to fuci by a narrow and elongated foot, or swim in the manner described by Cuvier.

Genera, *Pterosoma, Glaucus, Laviogerus, Briareæa, Tergipes, Tethys, Melibe, Scyllæa Tritonia, Plæcobranchus*, &c.

NUISANCE, or NUSANCE, is a term derived immediately from the French *nuisance*, and ultimately from the Latin *nocere* 'to hurt.' It signifies an unlawful act or omission, which occasions annoyance, damage, or inconvenience to others. Nuisances may either be illegal acts or omissions of legal duties, and are of two kinds, *common* or *public* nuisances, which affect all persons, and *private* nuisances, which injure individuals. Among common nuisances are—annoyances in highways, public bridges, or navigable rivers, which are produced by rendering the passage inconvenient or dangerous, either positively by actual destruction, or negatively by omitting to repair in cases where the law imposes the duty of repairing.

Noxious processes of trade or manufacture in towns, are examples of common nuisances. The remedy for a public nuisance is by presentment or indictment; and the offender, upon conviction, may be punished by fine and imprisonment. By the Acts 11 & 12 Vict. cap. 123, and 12 and 13 Vict. cap. 111, a summary process is granted in respect to nuisances injurious to health.

Private nuisances are annoyances which affect individuals only. If, for instance, my neighbour builds a house so near to mine that he obstructs my ancient lights, or throws the water from his roof upon my house or land, this is a private nuisance. The remedy for a private nuisance is an action upon the case for damages. The *abatement* of a nuisance is literally the *beating* down or destruction of a nuisance. [ABATEMENT.]

NUITS. [CÔTE-D'OR.]

NUMA POMPI'LIUS, the second king of Rome, was a native of the Sabine town of Cures. On the death of Romulus the senate took upon itself the government; but as the people insisted that a king should be appointed, a contest arose respecting the choice of the king between the Romans and Sabines, and it was at length agreed that the former should choose a king out of the latter. Their choice fell upon Numa Pompilius, who was revered by all for his wisdom and knowledge.

Numa would not accept the kingly power till he was assured by the auspices that the gods approved of his election. Instructed by the Camena, or nymph, Egeria, he founded the whole system of the Roman religion; he increased the number of augurs, regulated the duties of the pontifices, and appointed the flamines, the vestal virgins, and the Salii.

Numa also divided among his subjects the lands which Romulus had conquered in war, and secured their inviolability by ordering land-marks to be set on every portion, which were consecrated to Terminus, the god of boundaries. He divided the artisans, according to their trades, into nine companies, or corporations. During his reign, which lasted thirty-nine years, no war was carried on; the gates of Janus were shut, and a temple was built to Faith. He died of gradual decay, in a good old age, and was buried under the hill Janiculum; and near him, in a separate tomb, were buried the books of his laws and ordinances.

Such was the traditional account of the reign of Numa Pompilius, who belongs to a period in which it is impossible to separate truth from fiction. According to Niebuhr and the writers who adopt his views of Roman history, the reign of Numa is considered in its political aspect only as a representation of the union between the Sabines and the original inhabitants of Rome, that is, the tribes of the Titienses and the Ramnes.

NUMBER. The notion of number is suggested by repetition or succession; and it is customary to call the actual things repeated, considered as a collection, a concrete number; while the notion formed from comparing the collection with one of the things collected is called an *abstract* number. This abstract number arises from repetition of objects, in which the attention is directed to the repetitions as repetitions, and not to the objects as distinguished from any other objects. It is therefore a number of times, not a number of things.

If we never numbered any things capable of division into parts like themselves, our notion of number would rest in what is now called *whole* number. If the intellect were taught to count by the beating of a clock, and never came in contact with any other magnitude except that of the intervals between the beats, it is difficult to see how the idea of fractions would be obtained. But when we come to put together continuous magnitudes, which might increase or decrease without any alteration except that of magnitude, such as lines, surfaces, &c., we then begin to see that the unit is purely arbitrary, considered as a magnitude, so that the consideration of smaller or larger units, and the reduction of processes from one unit to another, become necessary. Hence the doctrine of fractions, and finally that of Incommensurables.

The unit of magnitude and the unit of repetition are as distinct as concrete and abstract number. A given magnitude being chosen, we may fix our own ideas of other magnitudes and convey them to other persons by describing the repetitions of the given unit, which will severally give the other magnitudes: but it is incorrect to say that in arithmetic we can operate upon magnitudes represented by numbers; the operations are performed by our minds upon notions of repetition, not of magnitude. Any question of numbers arising out of geometry might, so far as the pure arithmetical processes are concerned, as well have the prototypes of its numbers in collections of beats of a clock or motions of the arm, as in repetitions of lengths or areas. It is not true that such simple successions would suggest as many problems as

geometry or commercial business; but that is a distinct consideration.

In mathematical language, every numerical symbol is called number, including 0, 1, fractions, whole numbers, and even infinity.

A very deceptive mode of speaking is common with regard to numbers, which divides them into *cardinal* and *ordinal*. Thus *one, two, three*, &c., are cardinal numbers, while *first, second, third*, &c., are ordinal. The real distinction is that of numeral *nouns* and numeral *pronouns*, to the latter of which the term ordinal might properly be applied.

NUMBERS, APPELLATIONS OF. Various names have been given to classes of numbers, each expressive of properties common to all in its class: they are pointed out in the following list:—

The whole scale, 1, 2, 3, &c., is called that of *natural* numbers; it is subdivided into the scale of *odd* numbers, 1, 3, 5, &c., and *even* numbers, 2, 4, 6, &c. These again are subdivided into *oddly odd* numbers, 3, 7, 11, &c.; *evenly odd* numbers, 1, 5, 9, &c.; *oddly even* numbers, 2, 6, 10, &c.; and *evenly even* numbers, 4, 8, 12, &c. When 0 is included in the list, it is considered as divisible without remainder by every number.

The division of numbers into *square* numbers, 1, 4, 9, 16, &c.; *cube* numbers, 1, 8, 27, 64, &c.; *fourth powers*, 1, 16, 81, 256, &c., and so on, may be carried to any extent.

A *prime* number is any one of the list 1, 2, 3, 5, 7, 11, 13, &c., no one of which is divisible by any number except unity and itself. A *composite* number is any one which is not prime.

A *figurate* number is any one out of any of the following series, the first excepted, which is only introduced as a basis.

	1	2	3	4	5	6	&c.
I.	1	3	6	10	15	21	&c.
II.	1	4	10	20	35	56	&c.
III.	1	5	15	35	70	126	&c.
IV.	1	6	21	56	126	252	&c.
V.	1	7	28	84	210	462	&c.
	&c.			&c.			&c.

Each number is the sum of the numbers in the preceding row: thus 84 is the sum of 1, 6, 21, and 56, and 84 is the fourth number of the fifth order of figurate numbers.

Polygonal numbers, as their name imports [POLYGON], may be subdivided into triangular, quadrangular, pentagonal, hexagonal, &c. To find the numbers which bear the name of an n-sided figure, form a series beginning with 1, and consisting of terms increasing in arithmetical progression, with a common difference $n-2$; and form the sums of terms of these series in the manner described. Thus for decagonal numbers, we have—

1	9	17	25	33	41	&c.
1	10	27	52	85	126	&c.

and the decagonal numbers are 1, 10, 27, &c.

NUMBERS, THEORY OF. The theory of numbers is in fact the science of whole or integer numbers, and its most general problem is—'Given any equation whatsoever involving two or more unknown quantities, or any number of equations between a greater number of unknown quantities, to determine every possible solution in which the values of the unknown letters are whole numbers.' It may also be considered that the science extends to the determination of all solutions which contain nothing but rational or commensurable fractions, all surd quantities or incommensurables being excluded.

Connected with the science before us is a very large quantity of properties of numbers, of which it must be said that they can be proved easily enough, but cannot be explained. Usually in retracing the steps of an algebraical demonstration, we can easily connect the result with common and self-evident notions, which seem both to justify the conclusion, to render it natural, and destroy much of the curiosity, and even interest, with which it is looked at by a person used to algebra, who hears of the conclusion for the first time. In the theory of numbers it seems to us that the curious character of the conclusions is not so much lessened by the demonstrations, and perhaps this may be the reason why the science becomes a sort of passion, as Legendre remarks, with most of those who take it up.

The theory of numbers is not of much immediate practical utility in the applications of mathematics, which generally involve continuously increasing magnitude, and in which therefore the introduction of whole numbers is a matter of convenience, and not of necessity. Again, the data of such applications are usually only approximate, so that an answer in whole numbers should such a thing occur, is not exact, and possesses no particular interest. Hence this theory is little studied by a very large class of mathematicians, among whom it is not uncommon to meet with a person deeply versed in the higher analysis, who does not even know the principal results obtained by Gauss or Legendre. The subject is, in fact, an isolated part of mathematics, which may be taken up or not, at the choice of the student.

The earliest consideration of the theory of numbers may have been made in India; but the earliest treatise is probably that of Diophantus, which consists of nothing else but problems of this science, insomuch that the theory itself has been sometimes called the Diophantine Analysis.

NUMBERS, THE BOOK OF, one of the books of the Pentateuch. The time over which the book extends is from the first day of the second month of the second year after the departure from Egypt, to the first day of the eleventh month of the fortieth year of the same epoch. We learn from the last verse of the last chapter that this book was written by Moses 'in the plains of Moab by Jordan near Jericho,' and consequently just before his death.

This book is quoted or referred to in the New Testament (compare Numb. xx. 11, with 1 Cor. x. 4, and Numb. xxi. with John iii. 14). The passage in chap. xxiv. 17-19 is generally understood as a prediction of the Messiah.

NUMERAL CHARACTERS. There are three simple and obvious modes of constructing symbols of number:—1, By arbitrary invention; 2, By the choice of letters of the alphabet; 3,

By a system of repetitions of a single unit, as I, II, III, IIII, &c., with marks of abbreviation. Some may doubt whether the first and third were ever really employed; but it is not known that we can assign to the Indian numerals any other origin than the first; and the third explains the Roman system with a degree of consistency which is most extraordinary, if it be only accidental.

Distinct numeral characters are found to have existed or to exist among the Chinese, Indians, Arabs, &c., Phœnicians, Palmyrenes, Hebrews, Egyptians, Greeks, and Romans; and others are given as having been in ancient use among the Mexicans. Of these the Indian system may belong to the first class; the Hebrew and the common Greek system to the second; and the Roman, Phœnician, Palmyrene, ancient Greek, Egyptian, and Chinese, to the third class.

The system received from the Hindoos, through the Arabs, and now adopted throughout Europe, has been gradually much altered in the forms of the symbols.

The Hebrews used the letters of their own alphabet, giving the finals a separate and particular value, as follows:—

א	ב	ג	ד	ה	ו	ז	ח	ט	י
1	2	3	4	5	6	7	8	9	10
כ	ל	מ	נ	ס	ע	פ	צ	ק	
20	30	40	50	60	70	80	90	100	
ר	ש	ת	ד	ם	ן	ף	ץ		
200	300	400	500	600	700	800	900		

The use of the final letters, as signifying numbers, is of newer date than the rest; the old system required the junction of subordinate numbers to express 500, 600, &c.

The Greeks, in some enumerations, have three distinct methods of expressing numbers; but the first of them, which consists in the use of the letters of the alphabet to denote the successive books of a work, as in the Iliad, is as much a method of naming as of counting. Something more to the point is the old system which occurs on inscriptions, in which the unit is represented by a single mark, five by Π (the initial of ΠΕΝΤΕ), ten by Δ (that of ΔΕΚΑ), and 100 by Η (that of ΗΕΚΑΤΟΝ). And in all cases five of any symbol are written by inclosing the symbol in Π: thus |Δ| is five tens, and |Η| is five hundreds.

The later Greek notation is as follows:—

α	β	γ	δ	ε	ϛ	ζ	η	θ
1	2	3	4	5	6	7	8	9
ι	κ	λ	μ	ν	ξ	ο	π	ϟ
10	20	30	40	50	60	70	80	90
ρ	σ	τ	υ	φ	χ	ψ	ω	ϡ
100	200	300	400	500	600	700	800	900
$\alpha_{,}$	$\beta_{,}$	$\gamma_{,}$	$\delta_{,}$	$\varepsilon_{,}$	$\varsigma_{,}$	$\zeta_{,}$	$\eta_{,}$	$\theta_{,}$
1000	2000	3000	4000	5000	6000	7000	8000	9000

The Roman notation, including all the varieties which occur in printed works, is as follows:—

1	I	50	L
2	II	60	LX
3	III	70	LXX
4	IIII, IV.	80	LXXX, XXC
5	V	90	LXXXX, XC.
6	VI	100	C
7	VII	200	CC
8	VIII, IX	300	CCC
9	VIIII, IX	400	CCCC
10	X	500	D, I$\text{I}\!\text{)}$
11	XI	600	DC, I$\text{I}\!\text{)}$C
12	XII	700	DCC, I$\text{I}\!\text{)}$CC
13	XIII, XIIV	800	DCCC, I$\text{I}\!\text{)}$CCC
14	XIIII, XIV.	900	DCCCC, I$\text{I}\!\text{)}$CCCC
15	XV	1000	CI$\text{I}\!\text{)}$, M, ∞, $\overline{\text{I}}$
16	XVI	2000	CI$\text{I}\!\text{)}$CI$\text{I}\!\text{)}$, IICIC, IIM
17	XVII	5000	I$\text{I}\!\text{)}\text{I}\!\text{)}$, $\overline{\text{V}}$
18	XVIII, XIIX	10000	CCI$\text{I}\!\text{)}\text{I}\!\text{)}$
19	XVIIII, XIX	50000	I$\text{I}\!\text{)}\text{I}\!\text{)}\text{I}\!\text{)}$
20	XX	100000	CCCI$\text{I}\!\text{)}\text{I}\!\text{)}\text{I}\!\text{)}$
30	XXX	1000000	CCCCI$\text{I}\!\text{)}\text{I}\!\text{)}\text{I}\!\text{)}\text{I}\!\text{)}$
40	XXXX, XL		

NUMERATION is a term generally applied to the art of representing numbers by distinct names and symbols, a sense in which the word is used by the oldest writers.

The fingers of the hand, or of both hands, or the united number of fingers and toes, furnished natural collections of reference on which the various quinary, decimal, and vicenary scales in existence have proceeded. The transition from counting by tens to counting by dozens might have been caused by the facility of subdivision which the number twelve possesses, though we rather doubt this explanation, at least unless we assume that the division of the Roman *As* into twelve *unciæ* is to be explained on the same principle. From this we think came the method of reckoning by dozens to be introduced throughout Europe, as would that by thirteens, if the Roman coin or weight had been so divided.

Our present numerative system is stated by writers to employ the words unit, ten, hundred, thousand, million, billion, trillion, quadrillion, quintillion, sextillion, septillion, octillion, nonillion, &c. But the greater part of this is pure statement; for the terms billion, trillion, &c., though defined by arithmetical writers, have never found their way into common use, the want of such large numbers having never been experienced. The French indeed have naturalised the term *milliard*, meaning one thousand millions, in matters of public debt and revenue, which only shows how little the term *billion* has been used among them; since, according to their writers, the milliard and billion are the same things.

The billions and higher denominations were never anything but a fancy of arithmetical writers, conceived after the time when elementary works ceased to be written in Latin. The probability of this is increased by their meaning different things in different countries: with us the billion is a million of millions, a trillion is a million of billions, and each denomination is a million of times the one preceding; with the French and the other continental nations (though not with some of the older Italians) the billion is a thousand millions, and each denomination is a thousand times the preceding.

NUMERATOR (or Numberer), the part of a

fraction which states how many of the aliquot parts of a unit are taken, such as are described by the denominator. Thus $\frac{3}{7}$, being three-sevenths of a unit, 3 is the numerator.

NUMERIA'NUS, MARCUS AURELIUS, succeeded to the Roman empire with his elder brother Carinus, after the death of their father, at the beginning of A.D. 284. Numerianus was with the army in Mesopotamia at the death of Probus but, instead of following up the advantages which his father had gained over the Persians, he was compelled by the army to retreat to Syria. During the retreat a weakness of the eyes obliged him to confine himself to the darkness of a litter, which was strictly guarded by the Prætorians. All orders were issued by Arrius Aper, the præfect of the Prætorians, who was the father-in-law of the emperor. When the army, after a march of eight months, arrived at Chalcédon, they insisted upon seeing their prince, and accordingly burst into the imperial tent, where they found the dead body of Numerianus. Suspicion naturally fell upon Aper. The soldiers elected Diocletian as the successor of Numerianus, and the new emperor immediately put Aper to death.

NUMIDIA was originally bounded on the E. by the territory of Carthage; on the W. by the Mulucha, the modern *Mulwia*; on the N. by the Mediterranean, and on the S. by the Gaetúli. The Roman province of Numidia was much smaller, being bounded on the W. by the river Ampsagas (*Wadi-el-Kebir*), and on the E. by the Tusca, the *Zain*, according to Dr. Shaw. The terms Numidia and Numidians are derived from the Greek word Nómades, a pastoral people, and the name might be applied to a large part of the population of Northern Africa; but when the Greek and Roman writers speak of the Numidians of Africa, they generally mean one of the two great tribes of Massaesylii and Massylii.

It was during the second Punic War that the Romans became acquainted with the Massaesylii, whose king then was Syphax, and with the Massylii, whose king at that time was Gala. Massinissa, the son of Gala, became the ally of the Romans; and at the close of the second Punic War he obtained all the dominions of Syphax, who had been his enemy, and also a large part of the Carthaginian territory. He died B.C. 149, and was succeeded by his son Micipsa, who lived till B.C. 118, and bequeathed his kingdom to his two sons, Adherbal and Hiempsal, and to his nephew Jugurtha. Jugurtha murdered the two other kings and usurped their possessions. The result was a war with Jugurtha, his defeat by the Romans, and his death, B.C. 106. [JUGURTHA.] Hiempsal II. was king of Numidia after Jugurtha, and he was succeeded about B.C. 50 by his son Juba I., who took a part in the civil wars against C. Julius Cæsar. On the death of Juba, B.C. 46, Numidia was made a Roman province by Cæsar, who gave the administration to Sallust the historian.

The chief town in Numidia was Cirta, now *Constantina*. Hippo Regius, near the site of the present *Bona*, was not far from the coast: it was the see of St. Augustin. At the mouth of the river Tusca was Tabraca, now Tabarca; and south of Tabraca was Vaga or Vacca, which Sallust describes as the chief commercial town in Numidia. The position of Zama, where Hannibal was defeated by Scipio, B.C. 201, is uncertain.

The western part of the kingdom of Numidia was included in the Roman province of Mauritania.

NUMISMATICS. [COIN; MEDAL.]

NUN. [MONK.]

NUNCIO. [LEGATE.]

NUÑEZ, or NO'NIUS, FERNAN, was born at Valladolid in the latter half of the 14th century. Although a knight of the military order of Sant' Iago, he devoted all his ardour to literary pursuits and the diffusion of learning through Spain. Cardinal Cisneros appointed him and Demetrius the Cretan professors of Greek at his university of Alcalá, and moreover intrusted to him and to Lope de Astuñiga the Latin version of the 'Septuagint.' In 1821 he opposed some of the measures of Charles V., in consequence of which he was forced to leave Alcalá, and went to Salamanca, in which university he taught Greek, Latin, rhetoric, and the natural history of Pliny. He died in 1553, above the age of 80, at Salamanca, and left to that famous seminary his select library. He wrote for himself the following epitaph:—'Maximum vitæ bonum mors!'

Besides the share that he had in the 'Complutensian Polyglot,' Nuñez published 'Annotationes in Senecæ Philosophi Opera,' the text of which writer he restored; 'Observationes in Pomp. Melam;' 'Observat. in Hist. Nat. C. Plin.,' which have often been reprinted; 'Glosa sobre las Obras de Juan de Mena,' which is full of classical learning; 'Letters to Zurita;' 'Refranes y Proverbios Glosados,' which he left incomplete in the midst of his infirmities.

NUREMBERG. [NÜRNBERG.]

NÜRNBERG, a large town in the Bavarian circle of Rezat, and formerly a flourishing member of the Hanseatic League, is situated in 49° 27′ N. lat., 11° 4′ 15″ E. long., and has about 41,000 inhabitants. It stands on a high and well-cultivated plain on the Pegnitz, which divides the city into two unequal parts. The Pegnitz forms three islands within the walls, which are connected with each other and the city by several bridges. The town is surrounded by an old wall pierced by 8 gates, flanked by a great number of towers, and girt by a moat nearly 200 feet broad. The circuit within the walls is three miles and a half, within which space there are many squares and gardens. The streets are in general broad and well paved, but crooked and irregular. The houses are very old-fashioned, both internally and externally; the fronts are often adorned with paintings. One of the most remarkable buildings is the old fortress, which stands on a pretty steep eminence, and is an excellent specimen of the ancient style. It now contains a gallery of pictures. The town-hall, one of the finest in Germany, contains, among other curiosities, a number of paintings by Albert Dürer. Almost all the churches (10 in number) are worthy of observation for their architecture and the works of art which they contain. Near

the church of St.-Ægidius is the gymnasium, in front of which there is a statue of Melancthon. The former Dominican church contains the city library of 20,000 volumes. Nürnberg has many well-conducted public institutions, viz.—a gymnasium, a polytechnic institution, 15 free-schools, a training school, a society for the promotion of manufactures, &c. The manufactures of Nürnberg are articles of iron, steel, and brass, hardware of all kinds, turnery, looking-glasses, musical instruments, paper, engravings, painters' colours and pencils, glass, porcelain, watches, calicoes, carpets, and toys. There is an annual fair, at which a good deal of business is done.

NUT. [Corylus.]

NUT-WEEVIL. [Balaninus.]

NUTATION. [Precession and Nutation.]

NUTCRACKER. [Corvidæ.]

NUTHATCH, the vernacular name for a scansorial British bird, with much of the habits of the Woodpeckers, and which may be taken as an apt illustration of the genus *Sitta* of Linnæus.

Example.—*Sitta Europæa*, the Common Nuthatch, or Nutjobber.

This is in all probability the Sitte (Σίττη) of the Greeks, and *Sitta* of the Latins. It is the *Ziolo, Picchio Grigio, Raparino*, and *Picchio Formicajo* of the Italians; *Torchepot* and *Pic-Maçon* of the French; *Kleiber* and *Blauspecht* of the Germans.

Like the Woodpeckers and Creepers, the Nuthatch runs with facility upon and about the trunks and branches of trees; but the tail, which is short and rounded, is of no assistance to the bird in its progress. The Nuthatch however runs with the head downwards as well as upwards, and it sleeps in that posture. Its food consists of insects and their larvæ, berries, and nuts. The latter it fixes in some chink, and cracks them by repeated strokes of the bill.

Nuthatch (*Sitta Europæa*).

Geographical distribution, Europe generally. Temminck notes its range as extending far to the north and south, and as rather abundant in central Europe. Mr. Selby traced it in Britain as far north as the banks of the Wear and Tyne; and it is noted in Mr. Thompson's Irish list.

Mr. Gould describes and figures two other species, *Sitta rupestris* and *Asiatica*, in his 'Birds of Europe.'

The genus is found in India and America; and there are closely allied forms in the Indian Archipelago and in New Holland.

NUTMEG. [Myristica Moschata.]

NUTRITION. One of the chief differences between inorganic and organic bodies is, that the former retain their form and other characters by a passive resistance to change; the latter by a constant change of their particles, in which those that in the constant actions of life or by the influence of external agents have been destroyed, are replaced by others similar to themselves. This constant change is effected by the process of nutrition. Nutrition is the last step of the general process of assimilation, by which living bodies convert the materials which they derive from their food into substances like their own, and appropriate the materials thus changed to their own increase or repair. The several nutritive matters received into the living body are variously altered by digestion, absorption, respiration, and by all the other changes which the blood or other fluid undergoes in its passage to the several parts of the frame. These changes constitute the process of assimilation, at the end of which each part of the body abstracts from the general and homogeneous mass of nutritive fluid that which is required for its own growth or repair; muscle abstracting particles to form muscle, nerves from the same fluid abstracting particles to form nerve, and so on.

The process of nutrition is concerned in the production of two apparently different results—that of development and that of growth. In development the added particles not merely increase the size of the part, but produce a change in its form or its substance. Thus, the whole body, with all its varieties of tissues, and through all its changes of form, is *developed* by nutrition, from a small part of a little sac, which, to all appearance, is composed of homogeneous materials. [Fœtus.] In *growth* each part increases by the predominant deposition of particles within and around those of which it was previously composed, and similar to them. These two nutritive processes, though in the period of life previous to the adult age they are usually concurrent, may go on independently of each other. Thus the body may be deficient in development, some part of it being monstrous, that is, remaining of the same form as that which it had in the embryonic state, and yet with this defect in form it may increase in size, for monsters are commonly well-grown; and, on the other hand, being perfect in development and form, the body, or some part of it, may be deficient in size. A dwarf is an example of a defect of growth; a hare-lip, a cleft palate, an anormal unossified cartilage, are examples of defects of development: both are defects in the process of nutrition, but the failure is in *each* in a different direction.

One of the most important facts regarding the process of nutrition is, that all the tissues of the body, however different in their fully-developed shape, yet originate from the same fundamental forms, and up to a certain period of their development pass through the same series of changes.

It has been shown that the law of development from cells, which Schelden had proved to obtain in the formation of all vegetable tissues ('Principles of Scientific Botany,' translated by Lankester), holds with equal truth in all the animal tissues, and thus that in their first periods of existence all organised structures follow the same laws of formation.

The material of nutrition is in animals obtained from the arterial blood, which is constantly sent into the vessels distributed amongst or near the elementary structures of each tissue; but the proper act of nutrition is performed not by the power of the blood-vessels, as has been commonly supposed, but by the cells and the structures analogous to them, which convert the common nutritive matter drawn from the blood into their own proper tissue.

In healthy nutrition each part appropriates particles similar to its own, or differing according to certain laws of development; in disease, parts frequently appropriate other substances than their own, and all the solid products of various diseases may be regarded as the effects of morbid processes of nutrition.

The most complete exercise of the process of nutrition in repairing injuries, whether from accident or disease, is exhibited in the regeneration of parts, but in man and the higher animals there are but few examples of a perfect reproduction of the injured or destroyed tissue. The bones and the non-vascular tissues are probably the only instances in which a tissue destroyed by disease is replaced by one similar to itself.

NUX VOMICA. [Strychnos.]

NYCTERI'BIA, a genus of parasitic insects of the order *Diptera*. They are closely allied to the Horse-Flies (*Hippoboscidæ*). They have neither wings nor balancers. Their intermediate legs are connected at the base by a pair of comb-like organs supposed to represent wings. They live on the bodies of bats.

NYCTI'CORAX, Mr. Stephens's name for a genus of *Grallatores*, or *Wading Birds*, belonging to the family *Ardeadæ* or *Ardeïdæ* (Herons and Cranes). [Ardea; Herons.]

In general characters and habits, and in the pectination of the middle claw of the fore toes, the genus *Nycticorax* approaches the Herons, but the general figure is less slender, and the neck and tarsi are shorter.

This form, of which at least seven species are now known, is widely diffused. Species occur in Europe, Asia, Africa, and America; and have been found in Manilla, New South Wales, and Tierra del Fuego.

Example.—*Nycticorax Europæus*, Stephens; *Ardea Nycticorax*, Linnæus.

The Common Night Heron appears to affect high situations by day, and in the evening resorts to the low-lands, marsh, or river side, for its food, which consists of fish, for choice, and in their absence of frogs, mice, and even insects. Its fondness for perching on high situations is attested by Mr. Gould, who received a fine adult specimen which had been shot from a high tree in the gardens at Frogmore near Windsor. The nest is built of sticks on the topmost branches of trees, and the bird breeds, like the Common Heron, in society. Where there are no woods, the nest has been found among reeds. The eggs, four in number, are pale greenish blue.

The genus is rare in England; but common in Spain and South-Eastern Europe, as well as throughout a great part of Asia (China, India) and Africa. A closely-allied species, the Qua-Bird (*N. Americanus*, Bonaparte; *Ardea Nycticorax*, Wilson), is a native of North America. By most ornithologists the American and European species have been regarded as identical.

NYKÖPING. [Sweden.]

NYL GHAU. [Antelope.]

NYMPHÆA'CEÆ, a natural order of aquatic plants, with floating leaves and solitary flowers, found in all the hot and temperate parts of the world. The species of this order are generally plants of great beauty, either the flowers or the leaves being of unusual size. The White Water-Lily (*Nymphæa alba*) and the Yellow Water-Lily (*Nuphar luteum*) of our own rivers and ponds are among the finest specimens of floral development in these latitudes. In other countries both their size and colour are augmented, brilliant tints of blue and crimson being added to the pure white of our native species, and the most delicious odour being also emitted. In Demerara grows the *Victoria regia*, whose flowers have a diameter of fifteen inches, while the leaves are as much as six feet and a half across. In the East Indies the *Euryale ferox* emulates the Victoria in the size of the leaves, but its flowers are small and inconspicuous. In both these plants the farinaceous seeds are used for food.

NYMPHS (*Νύμφαι, Nymphæ*) were female deities in the Greek and Roman mythology, who were supposed to preside over all parts of the earth. Those who presided over rivers, brooks, and springs, were called *Naiads*; those over mountains, *Oréades*; those over woods and trees, *Dryades* and *Hamadryades*; those over the sea, *Nereids*; those over valleys, *Napææ*, &c. They are represented as beautiful young women. Their lives were very long, but they were not immortal. They were worshipped in many parts of Greece, and were propitiated by offerings of milk, oil, and honey, and by sacrifices of lambs.

NYSSO'NIDÆ, a family of Hymenopterous insects belonging to the section *Fossores*. This family is thus characterised by Latreille:—Labium either entirely or for the most part hidden; the maxillæ and labium do not form a proboscis; mandibles without any internal notch; head moderately large; abdomen either conical or somewhat ovate, and with a short peduncle; antennæ filiform, with the first joint but slightly elongated

The principal character which distinguishes this family from its congeners is the absence of a notch on the inner side of the mandibles. It contains the following genera:—*Astata, Nysson, Oxybelus, Nitela*, and *Pison*.

(Cuvier, *Règne Animal*, vol. v., p. 327; Shuckard on the *British Fossorial Hymenoptera*.)

O, in the vowel series, if arranged according to the nature of the sound, occupies the position between *a* and *u*.

1. It is convertible with the adjoining vowel *u*; hence arises the confusion between the Latin second, or *o* declension, and the fourth, or *u* declension, to both of which belong *ficus, cibus, senatus, tumultus, ornatus, laurus, domus*, &c.

2. With *a*. Grimm has pointed out this change as existing between the Latin and Teutonic tongues, as *doma-re, longus, odium*, &c., compared with *zähm-en, lang, hass*, &c. Hence too the double form of the name *Longobardi* and *Langobardi*. So, in Latin, from the root *gno* (*gnosco*) were formed *gnarus* and *ignarus*; and again, from these *narrare* and *ignorare*, in the latter of which the original vowel reappears. [See A.]

3. With the long *ē*, the sound of which must be considered as the same with the English *a*. Hence in Greek, Ευπατωρ, απατωρ, &c., from πατηρ; and the Latin *sol, cor* correspond with the Greek ἥλιος and κηρ (observe too the German *herz*). The German *jener* is in English *yon*. [See E.]

4. With *ou*. This interchange is virtually the same with the first-mentioned. It is not uncommon in French, as compared with Latin, as *novella, nouvelle*.

5. With *uo*, especially in Italian, as *huomo, buono*, from the Latin *homo, bonus*.

6. With *eu*, in French, as *lieu, feu, jeu, peu, leur*; from the Latin *locus, focus, jocus, pauci* (and Italian *poco*), *illorum*.

7. With *au*. This exists within the Latin; as *cauda* and *coda, caudex* and *codex, Claudius* and *Clodius, plaudo* and *plodo*. So from the Latin *aurum, audere* (whence the frequentative *ausare*), *Anfidus*, the Italians have *oro, osare, Ofanto*; and the French *or, oser*. Hence too the French pronunciation of the diphthong *au*.

8. With *oa*. Thus, the English words *boat, oath, oak*, must have received their present orthography when both the vowels were pronounced, as they still are in some parts of England, *bo-at, o-ath*, or *boo-at, oo-ath*.

9. With *ue*, as in Spanish *bueno, luego, fuego, huesped*; from the Latin *bonus, locus, focus, hospes*.

10. An initial *o* with *hue* or *hui*. Hence from the Latin *ostium, ostiarius*, are derived the French *huis, huissier*, and the English *usher*. From the Latin *os*, a bone, *ovum*, an egg, the Spaniards have *hueso, huevo*. From the Latin *octo, ostrea*, come the French *huict* or *huit, huistre* or *huitre*.

11. In the paragraphs numbered 5, 9, and 10, the *o* really takes the sound of the English *w*, or the Greek digamma; and the same is the case in the Greek language itself, as in οικος, οινες, οιδα, Οαξος (which is the true reading in Herodotus, iv. 154) for Fικος, Fινος, Fιδα, Fαξος; the first three of which may be compared with the Latin *vicus, vinum, video*. Closely allied hereto is the frequent interchange in Latin of *oe* or *oi* with *ū*. [See U.]

12. With *ea*, as between German and English. Thus the former language has *strom, brod, gross, tod*; the latter *stream, bread, great, death*. This same change exists in the English by itself, as *cleave, clove; weave, wove*.

13. With *ei*, pronounced as the Engish long *i*. This is exceedingly common in the same languages. Compare the German *beide, bein, ein, kleiden, mannheit, zeichen*; with *both, bone, one, clothe, manhood, token*. This change also exists within the English language, as *shine* and *shone; strike* and *stroke; drive* and *drove*.

14. A short ŏ with a short ĕ. [See E.]

15. For the tendency of the final letter *n* to disappear after *o*, see N.

OAK. [Quercus.]

OAK BARK. [Bark.]

OAKHAM. [Rutlandshire.]

O'ASIS (in Greek Ὄασις and Ἄϋασις, in Arabic *wady*), is the appellation given to those fertile spots watered by springs and covered with verdure which are scattered about the great sandy deserts of Africa. The Arabic and the Greek name seem to contain the same root.

OATES, TITUS, was the son of a ribbon-weaver, who, having seceded from the Anabaptists, among whom he was a preacher, conformed to the doctrines of the English established church, took orders, and held a benefice. Titus was educated at Merchant Taylor's School in London, and at Cambridge; he received ordination, and became a country curate. He was subsequently accused of perjury, and was twice convicted. He next became chaplain in one of the king's ships, from which he was disgracefully expelled. Shortly afterwards, by his own account, he was admitted into the service of the Roman Catholic Duke of Norfolk, embraced Roman Catholic doctrines, entered the College at St. Omer, and resided for some time among the students. On his return from a mission to Spain in 1677, the Jesuits dismissed him from their seminary. But these circumstances would not have caused his name to be remembered. His most notorious exploit was the disclosure in 1678 of the pretended 'Popish Plot,' the object of which, he asserted, was to establish the Pope in the government of Great Britain, and to effect the extirpation of Protestantism altogether. The story was extravagant, and the evidence in its favour of a very doubtful character, but the sudden death—by foul means, as it was supposed—of Sir Edmond-

bury Godfrey, the magistrate who had taken Oates's depositions, gave some colouring to the story; and the kingdom was for a time thrown into a state of violent excitement. Several persons were punished on the accusations of himself and his associates, Bedloe and Tong, and these men were sanctioned by the support of the House of Commons. During the closing years of Charles II's reign, Oates received a pension of 1200*l.* a year. When the Duke of York succeeded to the throne, Oates was convicted of perjury, sentenced to imprisonment for life, and to be whipped and stand in the pillory at intervals. He endured the punishment, and lived until William's reign, when he received a second pension of 400*l.* a year, and died at an advanced age.

OATH. An oath may be described generally as an appeal or address to a superior being, by which the person making it engages to declare the truth on the occasion on which he takes the oath, or by which he promises to do something hereafter. The person who imposes or receives the oath imposes or receives it on the supposition that the person making it apprehends some evil consequences to himself from the superior being, if he should violate the oath. The person taking the oath may or may not fear such consequences, but the value of the oath, in the eyes of him who receives or imposes it, consists in the opinion which he has of its influence over the person who takes it. An oath may be taken voluntarily, or it may be imposed on a person under certain circumstances by a political superior; or it may be the only condition on which the assertion or declaration of a person shall be admitted as evidence of any fact.

The law of England, as a general rule, requires all evidence or testimony for judicial purposes to be given on oath, and all persons may be sworn as witnesses who, being questioned on the occasion of taking the oath, will declare their belief in the existence of God, in a future state of rewards and punishments, and who will further declare their belief that perjury will be punished by the Deity. A Jew, a Mohammedan, and a Hindoo, may be sworn as witnesses, but they must severally take the oath in that form which is sanctioned by the usage of their country or nation, and which they severally consider to be binding. Children who are too young to understand the nature of an oath, and adults who are too ignorant or too weak in intellect to understand what is meant by an oath, cannot be sworn as witnesses. The offence of declaring what is false, when a witness is examined upon oath, constitutes perjury.

Declarations made by a person under the apprehension of immediate death are generally admitted as evidence in judicial proceedings, when properly verified. Quakers, in all civil cases, were allowed by the statute 7 & 8 Wm. III. c. 34, to give their evidence on affirmation; and now the affirmation of Quakers and Moravians is admissible in all judicial proceedings, both civil and criminal. When a defendant in chancery is entitled to privilege of peerage, or as a lord of parliament, he is required to give his answer to a bill upon honour only; and in the case of a corporation, the corporate body defendants put in their answer under their common seal. Other defendants are required to put in their answer upon oath.

An oath is required in England in a great many cases besides judicial proceedings; as for instance, on admission to places of public trust, and on a variety of other occasions. By an Act of the 5 & 6 Wm. IV. c. 62, the lords of the Treasury are empowered to substitute a declaration in lieu of an oath, solemn affirmation, or affidavit, in a variety of cases, such as relate to the revenues of Customs or Excise, the Post-Office, and other matters. The statute of 1 & 2 Vict. c. 77, provides the same privilege of solemn affirmation for persons who have been Quakers or Moravians, and have ceased to be such, but still entertain conscientious objections to the taking of an oath, as they would have enjoyed if they were still Quakers or Moravians.

OATS. [Avena.] The great use of oats, and the ease with which they are raised on almost every kind of soil, from the heaviest loam to the lightest sand, have made them occupy a place in almost every rotation of crops. Of all the plants commonly cultivated in the field, oats seem to have the greatest power of drawing nourishment from the soil, and hence are justly considered as greatly exhausting the land. Some farmers on this account prefer buying all their oats in the market to raising them on their own land. Where the soil is well adapted to the growth of wheat and barley, which bear a better price, this may be a judicious plan; but with proper management, a crop of oats may give as great a profit on the best land as any other crop, when it it considered that it requires less manure and produces an abundance of straw, which is very fit for the winter food of horses and cattle, especially when aided by roots or other succulent food.

To make a crop of oats profitable, some attention must be paid to the preparation of the soil and to free it from weeds; for to sow oats on a foul wheat or barley stubble slightly turned in by the plough, as is sometimes done, is the reverse of good husbandry.

The best oats are raised in Scotland and in Friesland, and in both countries the land is carefully cultivated. In Scotland, oats are generally sown on a grass layer which has been in that state for some years, and sometimes on old pastures, which are broken up for the purpose. The crops exceed in bulk and weight of grain all that the most sanguine person, unacquainted with the system, would expect, and in many seasons, not favourable for the wheat crop, oats are much more profitable. Wherever the land is not of a good quality, and wheat is apt to fail, oats are a much safer crop, especially in retentive soils, as rye is on poor sands.

When oats are sown after turnips, cabbages, or any other green crop, the land should be well ploughed, if the green crop was not consumed on the spot, and a moderate supply of manure will be well repaid by the increased produce. A heavy loam is best suited for oats: they require a certain degree of moisture, and a deep soil is very favourable to their growth. When oats are sown after artificial grasses, the land is seldom ploughed

more than once, and the seed is sown on the fresh mould which has been turned up; but, unless the land be very free from weeds, it would be better to plough the sward with a shallow furrow early in autumn. Before winter the scarifier would break the rotten sward, which might then be buried deep by another ploughing. The land would be ready for sowing early in spring, which is a great advantage, both as to the quality of the oat crop and the earlier harvest, especially in those districts where the latter part of the autumn is apt to be stormy and rainy. The land thus treated would be clean, and the fallow, which is often resorted to, of necessity, after a crop of oats, might be dispensed with, as the weeds have been destroyed and buried deep.

When oats are sown on light land after turnips, which have been eaten by sheep folded on them, it may be ploughed with as shallow a furrow as will turn in the surface: the preparation for turnips will have sufficiently moved the soil; and the manure of the sheep should not be buried too deep. On poor moist land oats are more profitable than barley. Clover and grass seeds may be sown among them with equal advantage, as they will seldom grow so high as to be laid and smother the young clover; and barley is very apt to fail on land subject to retain the water.

In sowing oats more seed is often used than of any other grain, because, although the plants tiller where they have room, the straw of the second shoots is weaker, and the grain is not ripe so soon as that of the principal stem; but when the plants rise close and thick, there are no tillers, the main stem is stronger, and the corn is more plump and equal. Six bushels of oats are often sown on an acre; but if they are drilled, four bushels are sufficient, and when dibbled, which is sometimes the case in Norfolk and Suffolk, much less seed is used.

Oats, when fully ripe, are very apt to shed, and many are lost for want of attention. As soon as the straw turns yellow under the panicle, the oats should be reaped, however green the lower part of the straw may be: the straw will be better fodder for cattle, and all the corn will be saved. Oats are generally mown with a scythe, and raked into heaps to dry like hay; but this is a wasteful and slovenly practice. A good crop of oats should be reaped, like wheat, close to the ground, and tied in sheaves. The produce of an acre of oats varies according to the soil and preparation, from four to eight, and even ten quarters.

In some countries the oats are given to horses in the straw, without thrashing them; and where the quantity can be regulated the practice is good. The horses masticate the corn better in the chaff, and the straw is wholesome; but where horses do hard work, they would be too long in eating a sufficient quantity, and it is better to give them oats thrashed and cleaned, with clover hay cut into chaff. When hay is dear, it is often cheaper to increase the quantity of oats, and to give it with wheat-straw cut fine. In this way very little hay is required. The calculation is easily made when we consider that a pound of good oats gives as much nourishment to a horse as two pounds of the best clover, or sainfoin hay. A truss of hay of 56 pounds is therefore equal to 28 pounds of oats; or a bushel of the best oats will go as far as one truss and a half of hay; and if this quantity is worth four shillings, which is at the rate of 4*l.* 16*s.* per load of thirty-six trusses, the equivalent price of oats is 32*s.* per quarter.

OAXACA. [Mexico.]

OBADI'AH was one of the twelve minor Hebrew prophets. His prophecy appears (verses 11–14, 20) to have been written shortly after the destruction of Jerusalem in 587 B.C.

It is the shortest book in the Old Testament, consisting of only one chapter. The style of Obadiah is clear and energetic; his prophecy forms a short poem.

OBELISK, from the Greek 'obeliscus' (ὀβελίσκος), the diminutive of 'óbelus' (ὀβελὸς), which signifies a 'skewer' or 'needle' (Herod., ii. 41), but is also used by Herodotus (ii. 111) to signify an *obelisk*. An obelisk is a lofty monumental four-sided shaft diminishing upwards with the sides gently inclined, but not so as to terminate in an apex at the top; neither is it merely truncated or cut off at the summit, but the sides are sloped off so as to form a flattish pyramidal figure, by which the whole is suitably finished off and brought to a point. From the earliest ages it had been the practice to mark some particular spot, the scene of some important event, by what might serve as a durable monument of it; nor would any thing more naturally suggest itself for such purpose than fixing in an upright position a stone of unusual dimensions. Among the Egyptians the practice was remarkable on account of their continuing it, and bringing such simple primæval monuments to great perfection, making them of stupendous dimensions, working them in the most elaborate manner, and adorning them with hieroglyphics, though not indeed invariably, for there are instances of Egyptian obelisks which are not so sculptured.

Small obelisks were sometimes of sandstone or granite, but the larger Egyptian obelisks are all of the red granite of Syene; and it is certainly astonishing how such enormous masses of that material could be quarried out, and afterwards removed and placed in their position.

The Egyptians do not appear to have raised their obelisks as insulated monuments or single objects, but as the accompaniments to temples and palaces, where they were placed in pairs, one on each side of a large entrance, or *propylon*, and it may therefore be inferred that some particular signification was attached to them. They were also sometimes placed in the interior courts of temples. With respect to their proportions, the shafts of obelisks were usually about ten diameters in height, and one-fourth narrower at top than at their base. The pyramidion, or apex, was made much more pointed in some obelisks than in others. One singularity is that few Egyptian obelisks are perfectly square, two of their sides being generally somewhat broader than the other two, which may be accounted for by what has just been said, that they were placed against buildings, and not intended to be insulated objects viewed from every direction.

When the Romans became masters of Egypt, they removed many of these monuments to their own capital, among others that of the Lateran, which is the largest now known, its shaft being 105 feet (although it has been reduced, a portion at the lower part having been cut off in consequence of being fractured), and two of its sides 9 feet 8½ inches, the other two 9 feet. This obelisk was first conveyed from Heliopolis to Alexandria by Constantine, and by that emperor's son Constantius brought from the latter city to Rome, where it was erected in the Circus Maximus. The shaft of the Lateran obelisk weighs about 445 tons in round numbers.

In the present century, the labour of bringing away and re-erecting an obelisk nearly equal to some of the largest removed by the Romans has been accomplished by the French. It is the smaller of the two which stood before the propylon of the temple at Luxor, and is about 76 feet high and 8 feet wide on the broader sides of its base. Permission for the removal of both the obelisks having been granted to the French government by the viceroy of Egypt, a vessel constructed for the purpose was sent out in March, 1831, under M. Lebas, an engineer, to whom the undertaking was confided, it having been previously determined to bring away only one. After three months' labour with 800 men, an inclined plane was formed from the obelisk to the river, where the vessel lay; and having been first carefully encased by planks to secure it from injury, the monolith was lowered by nearly the same process afterwards employed for raising it again on its pedestal at Paris, where it safely arrived, up the Seine, December 23, 1833, and was deposited near the Pont de la Concorde. Nearly three years however elapsed before it was elevated in the centre of the Place de la Concorde, which delay was partly occasioned by its being necessary first to construct a pedestal of as massive materials as could be procured. Blocks of granite were accordingly fetched from Brittany, the largest of which, forming the die of the pedestal, is 10 feet square by 16 in height. An inclined plane leading from the river up to a platform of rough masonry level with the top of the pedestal was then formed, and the obelisk, having been placed on a kind of timber car or sledge, was dragged up by means of ropes and capstans. One edge of its base having been brought to the edge of the pedestal, it was reared perpendicularly by ropes and pulleys attached to the heads of ten masts, five on each side, and within about three hours the operations were completed, under the direction of Lebas, October 25, 1836.

The largest Egyptian obelisk hitherto brought over to this country is that which was removed from the island of Philæ by Belzoni, and which is now erected at Kingston Hall, Dorsetshire. It is a monolith of red Egyptian granite, 22 feet 1 inch in *length*, and its larger end, or base, 2 feet 2 inches square, the other being 1 foot 5¾ inches.

For further particulars the reader may consult the 'Egyptian Antiquities,' in the *Library of Entertaining Knowledge*, vol. i.

OBERLIN, JEREMIAH JAMES, was born at Strassburg Aug. 7, 1735, and was educated at the gymnasium of that town. He took the degree of Doctor of Philosophy in 1758. In 1768 he was appointed a teacher in the gymnasium where he had been educated, and in 1763 was entrusted with the care of the library of the university of Strassburg, and obtained permission to give lectures on the Latin language. In 1770 he was appointed Professor of Rhetoric, and from this time he was accustomed to give lectures on Greek and Roman archæology, ancient geography, &c. In 1778 he was appointed Extraordinary Professor in the university, in 1782 Ordinary Professor of Logic and Metaphysics, and in 1787 Director of the Gymnasium. He died Oct. 10, 1806.

Oberlin was an accurate and industrious scholar. He published good editions of several of the Latin classics, of which his Tacitus and Cæsar are considered the most valuable. He was also the author of several other works, the principal of which are—'Dissertatio Philologica de Veterum Ritu condiendi Mortuos,' 1757; 'Rituum Romanorum Tabulæ in usum Auditorum,' 1774; 'Jungendorum Marium Fluviorumque omnis ævi Molimina,' 1770-1775; and Dissertations sur les Minnesingers' (the Troubadours of Alsace), 1782–1789.

OBERLIN, JEAN FRE'DERIC, Protestant pastor in the Ban de la Roche, was born at Strassburg, August 31, 1740. He entered the church, and in 1766 was invited by M. Stouber to succeed him as pastor of the Ban de la Roche. This place, which is called in German the Steinthal (valley of stone), was part of the former province of Alsace: it is situated on the western slope of the Haut Champ, or Champ de Feu, a range of mountains to the east of the Vosges, from which chain it is divided by a deep valley. Nearly all the inhabitants are Lutherans. The soil is sterile, and in the middle of the eighteenth century it afforded a bare subsistence to some eighty or a hundred families, who were in a state little removed from barbarism. Notwithstanding all Stouber's previous exertions, Oberlin found his parish in a wretched state, and a large party in it obstinately prejudiced against any improvement, and prepared to oppose all his plans. By his influence and example he caused the inhabitants to follow agricultural and manufacturing pursuits, to become active, enterprising and prosperous. He provided for their education by erecting a school in each hamlet; and, while pursuing these schemes for their worldly advantage, never once relaxed in his exertions as a religious teacher. Notwithstanding his extensive benevolence, and although in 1795 he renounced his stipend on account of the poverty of his people, his economy was so strict that he was never known to owe a single sous. Louis XVIII. presented him with the decoration of the Legion of Honour, as an acknowledgment of his services; and in 1818 he received a gold medal from the Royal and Central Agricultural Society of Paris. Oberlin died June 1, 1826, in the 86th year of his age and the 59th of his residence in the Ban de la Roche. Any account of his life would be incomplete without some notice of *Louisa Schepler*, who was originally his ser-

vant and a conductress in one of his schools. During his life, and after his death, she employed all her energies and the whole of a little property which she possessed, in works of benevolence. She died July 25, 1837, at the age of 76, having been a conductress 58 years.

OBESITY is an excessive accumulation of fat in various parts of the body. The average quantity of fat in healthy men is from $\frac{1}{10}$ to $\frac{1}{3}$ of the weight of the whole body.

Obesity may occur at all ages; it is not uncommon in children; is far more rare in youth and in the early periods of manhood; and is most common after the age of 40, at which time an increase in the quantity of fat is observed in perhaps the majority of persons.

The chief accumulations of fat take place beneath the muscles, in the omentum and mesentery, about the heart, on the chest, and under the chin. In all these parts a certain quantity of fat naturally exists, and here therefore its amount is merely increased; but, in cases of excessive obesity, it accumulates in situations where before there was none, as among the minute fibres of the muscles even of the heart, and in various other tissues. Active exercise, diminished sleep, and a dry, spare and nutritive diet are the best remedies for excessive obesity.

OBLATE, a term applied to a spheroid which is made by the revolution of an ellipse about the smaller of the two axes.

OBLIGATION, from the Roman word Obligatio, a word which simply signifies a 'binding.' The termed is sometimes used in our English system; and, properly understood, it comprehends all debts or duties which a man can owe to a certain person or certain persons. It is a larger term than *contract*, which is merely one of the events out of which obligations arise; for there are obligations which are not founded on contract.

An obligation implies two persons at least, a debtor, or one who owes a certain Duty, and a creditor, or he to whom the Duty is due, or, to use another expression, he who has the Right. The word 'obligation' or 'binding' primarily refers to the facts by which the legal relation of debtor and creditor is established. It also expresses the duty of one party to the other, if the obligation is unilateral; and the mutual duties, if the obligation is bilateral. The word which expresses the determination or ending of the obligation is in Latin 'solutio,' and in English payment, discharge, performance, or some equivalent term. As duties owing from one man to another, or mutually owing, imply corresponding rights, the word Obligatio, in the Roman sense, is used to express also a Right, or mutual Rights, as the case may be; and also the whole relation between the debtor and creditor.

An obligation may arise from contract (and most obligations do arise from contract), but also in other ways. Agreement, either express or implied, is necessary to the formation of a contract; but it is not every agreement which produces a contract. It is necessary to look into the particular system of law of every country, in order to know what agreements or what kind of agreements are considered to be contracts, and consequently obligatory, or producing obligations.

In the Roman system, Obligations were considered to arise from Contract and Quasi-Contract, and from Delict and Quasi-Delict ('Inst.' 8, tit. 13). In the English, an instance of a contract is buying and selling; another is letting and hiring. An example of an obligation arising from Delict, is damage done by a man to another person's property, for which he is legally bound to make compensation. An example of a Quasi-Contract, that is of a contract founded neither in agreement nor in delict, is the case of a man acting for another in his absence in some concern or affair, without any commission (negotiorum gestio). If the English law, or English judges (for that is the meaning of the term English law in many cases), should allow a man, who has buried another at his own cost, when there was nobody to look after the interment, to recover the money from the personal representatives of the deceased, that is a case of obligation founded on a Quasi-Contract, according to the Roman system. ('Dig.' 11, tit. 7.) It is in fact no contract; and it is merely a positive rule, founded on utility or on considerations of general interest. If, in this case, the man who has paid for the interment can maintain an action, it is thereby admitted that he has a right; and it is at the same time admitted that those against whom he has a right, are under a duty or an obligation. Instances of obligations arising from Quasi-Delict are enumerated in the 'Institutes' (4 tit. 5).

This exposition is merely intended to explain the term Obligation, which is a term of English law only in very limited use; but, wherever it is used correctly, it may be understood from what has been here said. The doctrine of Obligation in the English law is hardly susceptible of any exact exposition; and is in a state of the greatest confusion, as any person may see, who will take the trouble of looking at any of the ordinary treatises. The Roman system is intelligible to any person when it is properly explained, and it is comprehensive enough for all the purposes of social life. The English practice in many cases arrives at the same results as the Roman by a different method; but sometimes the result of a system in which there is method and a spirit of equity is diametrically opposite to one in which there is no method and more of chicane than of justice. The doctrine of Consideration, as it is called, and the technical distinction between contracts under seal and not under seal are insuperable obstacles to the doctrine of Obligations being reduced to any scientific method in the English system.

OBLIQUE. This term is used as opposed to direct or right, and signifies whatever is not direct or right.

OBLIQUITY, a term used in astronomy to express the angle made by the ecliptic with the equator.

OBLONG, a word in common use, expressing the same meaning as rectangular.

OBOE, a musical instrument blown through a reed. It is a tube of boxwood 22 inches in length, slender in the upper part, but spreads out

conically at the lower end, and consists of three joints, or pieces, besides the reed. Its compass is usually two octaves and a fifth, from c below the treble clef, to c, the fourth added line above it. The instrument, which has been in use since the time of Edward III., was long known only by its French name of *Hautbois*.

OBOLUS was a Greek coin, both silver and brass. At Athens it was of silver, the sixth part of a drachma, and worth somewhat more than five farthings sterling.

OBSEQUENS, JULIUS, the author of a small work in Latin, which is entitled 'De Prodigiis.' The best edition is by F. Oudendorp, Leyden, 1720. Nothing is known about the author.

OBSERVANTS, Friars, a branch of the Franciscans. Some relaxation having been effected in the rule of the Franciscan order, it was thought requisite to restore it to its first rule and original institution; whereupon such as continued under the relaxed order were called Conventuals, and such as accepted the reformation were called Observants, or Recollects. This reformation was begun about 1400, by St. Bernard, or Bernardin of Siena; it was confirmed by the Council of Constance in 1414, and afterwards by Eugenius IV. and other popes.

OBSERVATION AND EXPERIMENT. The first of these terms includes a portion of the second, inasmuch as every experiment is made with a view of observing the result. But the latter signifies more than the former, implying a disposition of means of observation which it is in the power of the experimenter to make for himself, and which he actually did make for himself. If, for example, a person who observed the attraction of the magnet for the first time, dubious of the residence of the attracting power, were to move the magnet to another place, that he might see whether the attracted body would still move towards it, he would make an experiment. But if his magnet were the sun and the attracted body the earth, he could only wait the proper times for observing the motion of the latter with respect to the former, in order to establish the attraction. Thus astronomy, geology, meteorology, natural history, &c., are sciences of observation (that is, of nothing but observation); while mechanics, optics, electricity, &c., are sciences of experiment.

Everything which is called observation is of two kinds; in the first a simple individual fact is noted, in the second a magnitude is measured. The results of the first species are the proper subjects of inductive reasoning only; the results of the second, of inductive and mathematical reasoning, either or both. Individually, the first kind of observations are not necessarily subject to error: thus a zoologist observing the structure of a new animal might in every instance correctly note the resemblances which exist between it and other animals, and might refer it to its proper class in a manner which centuries of succeeding observation would not induce naturalists to disturb. Collectively however wrong inferences might be drawn from facts; thus, results of classification which are true of all animals known up to one moment, and are therefore inferred to be always true, may be disturbed in the next moment by the discovery of a new specimen.

Observations of the mathematical character are of necessity erroneous from the imperfections of our senses. When a new insect is observed, it is soon seen, for instance, whether it has or has not wings, and the question once settled is finally settled. But when, say the specific gravity of a gaseous substance, at a given pressure and temperature, is *measured*, it is impossible to consider the question as settled at any time. Say that, under given circumstances, the specific gravity is asserted to be .934 of that of air similarly circumstanced; this is only an admission, at most, of its being somewhere between .9335 and .9345.

The necessary errors of observation arise from the imperfection of our perceptions and of the instruments which we use, and also from hasty or otherwise incorrect conclusions. The subject requires the separation of these errors into three classes, which may be mixed up with one another in results, and may be mistaken for one another. We may call them *fixed*, *personal*, and *casual*.

By a *fixed* error we mean one which is inherent in the instrument or method employed, so that it must exist, and, all other things remaining the same, must have a given magnitude. Errors of this kind cannot be detected by multiplying similar observations, since there can be no tendency to destroy error in the mere repetition of it.

All instruments must be more or less erroneous in every particular. In the science of observation, as now understood, the assumption of perfection in an instrument, in any point whatsoever, is looked upon as nothing but the expression of the observer's unwillingness to take trouble.

By a *personal* error is meant one of the same character as a fixed error, but arising from the temperament or habits of the observer, and not from the instrument.

The errors which precede, though called errors because they give a result which is not the one intended to be obtained, yet are in fact the consequences of an actually existing state of things. They are then really measures of phenomena, called errors simply because the effects of their causes are to be removed from the results.

By *casual* errors, the only ones to which the name of errors can properly be given, are meant those which are absolutely inexplicable, or of which the cause and tendency are equally unknown. They must be considered as equally likely to be positive or negative; so that in the long run the results which they give too great will be compensated by those which are too small. If this be not the case, that is, if there be a greater tendency to too much than to too little, there must be a reason for this phenomenon, and a law of action, which must be sought for and detected.

If all the observations be equally good, the mean, or average, is more likely to be true than anything else. This is even true with reference to fixed or personal errors which may remain, but which are totally unsuspected; for there is an even chance of such errors acting in either way.

It might be supposed that the greater the

number of observations, the less, in the same proportion, the probable error of the average; but this is not true, since the probable error diminishes as the *square root* of the number of observations increases. Thus, suppose it to be well settled that twenty observations of a given observer will have an average of which it is an even chance that it does not err by (say) a unit: then the same observer must make *four* times as many observations to get an average with an even chance of not more than *half* a unit of error; *nine* times for one-*third* of a unit, and so on.

OBSERVATORY. [Greenwich Observatory.]

OBSIDIAN, a mineral which occurs in beds, in large and rolled masses and in small grains. Its structure is compact, colour greenish or grayish, and before the blow-pipe it swells up strongly and fuses into a transparent glass. It occurs in veins and beds traversing rocks. It consists chiefly of silica and alumina.

OBTUSE, opposed to acute, is applied to an angle which is greater than one right angle and less than two.

OBY. [Siberia.]

OCAÑA. [Castilla-la-Nueva.]

OCCAM, or OCKHAM, WILLIAM, an English scholastic philosopher, was born in the county of Surrey about the end of the 13th century. He was a pupil of Duns Scotus, 'the most subtle Doctor,' and, like his master, a member of the order of Franciscans. He opposed the Realism of Scotus and his followers, and formed a new speculative sect, bearing the name of Occamists, who revived the tenets of Nominalism. In the early part of the 14th century he taught at Paris. A book which he published, entitled 'De Potestate Ecclesiastica et Seculari,' drew down upon him the censure of the pope. He died at Munich in 1347. A list of his works, which includes a commentary upon the Predicables of Porphyry and the Categories of Aristotle, and many treatises of scholastic theology and ecclesiastical law, will be found in Fabricius's 'Bibliotheca Latina,' tom. iii., p. 466. Occam's 'Summa totius Logicæ' was published at Paris in 1488, and at Oxford in 1675, 8vo.

OCCIDENTE. [Mexico.]

OCCULTATION. This word, which might serve to designate any eclipse of one heavenly body by another, and even the effect of cloud or fog, is particularly applied to the eclipse of a fixed star by the moon.

When the moon approaches to the star, instead of an instant of contact, followed by disappearance of the star, the latter for a few seconds is frequently thrown upon the moon, as if it were the nearer body, and were going to cross the moon's surface, as Venus does that of the sun during a transit. While this is taking place, which sometimes lasts until the star has fairly left the moon's limb or border, the star preserves its light, though it frequently undergoes a change of colour. Aldebaran, whose natural colour is inclining to red, has been seen to present this phenomenon much more frequently than any other star, though many others have done it.

The occultations of Aldebaran approaching in the years 1829 and 1830, the Astronomical Society invited the particular attention of astronomers to them. The consequence was, a large number of communications from different parts of Europe, which are printed in the fourth volume of their Memoirs. Nothing can be more different than the results: some, who had not seen the phenomenon before, saw it for the first time; others, who had seen it before, did not see it; some, who had never seen it before, continued unable to do so. Of six observers at the Royal Observatory, five distinctly saw the projection on the moon's limb, and one saw it hang on the edge of the moon five or six seconds before it disappeared. Of three at the Observatory of Paris, two distinctly saw the projection, and one saw the star disappear instantaneously, leaving a shade on the part of the moon at which it disappeared. The majority saw the star either projected or hanging on the moon's edge. It is to be noted that this phenomenon has been seen, though rarely, at the dark edge of the moon as well as at the enlightened. Its cause is matter of much diversity of opinion.

OCEAN (Ὠκεανὸς) is a term used in an absolute sense to express collectively the immense mass of salt water that covers about three-fourths of the entire surface of the earth. The word first occurs in Homer, who uses it to designate the river or stream which, according to his idea, surrounded the surface of the earth like a circle. The Greek geographers however knew that the ocean was a wide expanse of water, which surrounded the land, and the term ocean was used by them in this sense. (Strabo, p. 121; Pomponius Mela, i. 1.) The term is also applied to large portions of this great mass of water which are separated from each other by tolerably well-marked boundaries. The widest expanse of salt water is the Pacific Ocean, which is said to cover 100,000,000 square miles, or nearly half the surface of the earth. The ocean which extends between Europe and Africa on the east, and America on the west, is called the Atlantic Ocean, and is estimated to cover nearly 30,000,000 square miles, including in this area the numerous seas that belong to it. That portion of the ocean which lies between the Pacific and the Atlantic is called the Indian Ocean. Its surface, including the Red Sea, Persian Gulf, Bay of Bengal, &c., is supposed to occupy more than 25,000,000 square miles. The northern coasts of Europe, Asia, and America do not extend to the Arctic Pole, but terminate between 70° and 80° N. lat. Between these coasts is a sea, which may be about 2000 miles across from one continent to the other. This sea is called the Arctic Ocean; it is connected with the Pacific by Behring's Strait, and with the Atlantic by the wide strait between Greenland and Norway. Its area is estimated at about 4,000,000 square miles.

OCELLUS LUCA'NUS, a Pythagorean philosopher, was a native of Lucania in Italy, and is supposed to have been a disciple of Pythagoras. The only work of his which has come down to us is 'On the Nature of the Universe.' Its chief philosophical topic is to maintain the eternity of

the universe (τὸ Πᾶν); Ocellus also attempts to prove the eternity of the human race (c. 3, s. 3). The best edition of Ocellus is by Rudolphi, Leipzig, 1801, which has a valuable commentary.

OCELOT. [TIGERS.]

OCHNA'CEÆ form a very small natural order of plants nearly allied to *Rutaceæ*. They are shrubs inhabiting the tropics of either hemisphere, with shining evergreen leaves, and showy yellow flowers.

OCHRA, or OKRO, a plant of which the fruit is used as a vegetable in the West Indies, the United States, and in South America, and which is remarkable for the similarity of its name to the vegetable called *Ochra* by the Greeks, but which has not been ascertained by botanists. The okro belongs to the genus *Hibiscus*, and is the *H. esculentus* of botanists, which is very closely allied to *H. abelmoschus*, now *Abelmoschus moschatus*, so long noted for its musk-scented seeds, and which by Browne, in his 'Nat. Hist. of Jamaica,' is called *Musk-Okro*.

OCHRE, hydrated sesquioxide of iron. [IRON.]

OCKLEY, SIMON, was born at Exeter in 1678, entered Queen's College, Cambridge, in 1693, was presented to the vicarage of Swavesey in 1705, was chosen professor of Arabic in the university of Cambridge in 1711, and died at Swavesey, August 9, 1720. Ockley was well acquainted with the Arabic. His principal work, 'The History of the Saracens,' which was originally published in 2 vols. 8vo., the first in 1708, and the second in 1713, was compiled from Arabic manuscripts in the Bodleian library at Oxford.

O'CREA (a boot) is a term used in descriptive botany to express those kinds of stipulæ which grow together by their back and front edges in such a way as to form a tube, through which the stem passes. The genera *Polygonum*, *Rheum*, and *Rumex* offer a common illustration of this structure.

OCTANS (the instrument commonly called a quadrant, which, when on Hadley's construction, is of the form of an *octant*, or eighth part of a circle), a constellation of Lacaille, situated at the south pole, which it includes.

OCTAVE, in Music, the eighth note of the scale, the most perfect of concords, whose ratio is 2 to 1.

OCTOBER, in the year of Romulus, was strictly what its name implies, the eighth month. With us it is the tenth.

O'CYMUM, a genus of labiate plants, remarkable for the fragrance of their leaves, which are used as an ingredient in savoury dishes, on which account some of the species have from time immemorial been objects of very general cultivation. In English gardens they are called *Basils*, a corruption of *Basilisca*, the name given to common basil by the monkish writers upon plants.

OCYPO'DIANS, a tribe of Brachyurous Crustaceans (Crabs) placed by M. Milne Edwards between the *Pinnotherians* and the *Gonoplacians*. The Ocypodians, as their name implies, are very swift runners. They live nearly always on the strand, and dig holes or burrows for their retreats. The anterior feet are generally compressed, and of very unequal size; the rest are long, and exhibit no great difference between themselves; the terminating joint is often depressed, but has never the form of a natatory oar. Abdomen narrow, generally composed of seven distinct segments. Carapace trapezoidal, broad anteriorly. Ocular peduncles developed. Locality, the hotter latitudes.

M. Milne Edwards, who remarks that this small and very natural group is closely allied to the genera *Doto* and *Mycteris* among the Pinnotherians, thus divides the tribe:—

Ocypoda.—Cornea transparent, very large, oval, occupying at least the half of the length of the ocular peduncles, and commencing very near the base of those stems.

Gelasimus.—Cornea transparent, very small, rounded, not occupying the fourth part of the length of the ocular peduncle, and only commencing close to its extremity.

Examples.—*Ocypoda arenaria*, the Sand Crab of Catesby, a native of the Antilles and the coasts of North America: this species, so remarkable for its velocity, hybernates in a burrow during the colder months. *Ocypoda hippea* (*Cancer Cursor*, Linn.), a native of Syria, Egypt, Cape de Verd, &c.

Gelasimus Marionis, a native of Manilla. The *Gelasimi* live in holes near the edge of the sea, in pairs, and the great claw of the male is used to stop the entrance of the retreat. The species are numerous.

ODE is derived from a Greek word, which signifies a song (ᾠδή, ἀοιδή), and appears to have been originally applied to any kind of poetry which was written to be sung or accompanied with music. The ode may be regarded as the foundation of lyric poetry, and differs from epic poetry in delineating the poet's own thoughts and feelings.

ODENSE. [FÜNEN.]

ODENWALD. [BADEN.]

ODER. [PRUSSIA.]

ODESSA, a flourishing seaport town in the Russian government of Kherson, is situated on the coast of the Black Sea, in 46° 28′ 54″ N. lat., and 30° 43′ 22″ E. long., about 40 miles W. of the estuary of the Dnieper, and 30 N. from the mouth of the Dniester, and has 70,000 inhabitants. It was founded in 1792 by order of the Empress Catherine, on the site of a wretched village, which stood on the north-western shore of the bay of Adschai. The site is well chosen. The bay is extensive, the water deep, and the anchorage good. The bottom is fine sand or gravel, and the bay is seldom frozen, and then only for a short time. The harbour, formed by two moles, is capable of holding 300 ships; it is strongly defended, and is provided with a lazaretto and a light-house. The Emperor Alexander appointed the Duke of Richelieu, a French emigrant nobleman, governor of the new town, which, under his judicious administration, rapidly improved. The town is regularly built in the form of an oblong parallelogram, on a declivity sloping towards the sea.

The surrounding country is an extensive but treeless plain. The streets are broad and straight, but not paved. The houses are in general two stories high, and built of stone. The finest buildings are—the Russian Cathedral of St. Nicholas, the admiralty, the hospital, the custom-house, the exchange, and the theatre. There is a fine public garden in the middle of the town. Between the harbour and the town there is a line of barracks, consisting of sixteen detached edifices; there are in the town nearly six hundred corn magazines, and a bazaar, which contains 550 shops. To the north of the town there are magazines of salt and salt meat, and to the west of them reservoirs of water, which are fed by an aqueduct. The chief literary and educational establishments are—the Richelieu lyceum, in connection with which there are schools of jurisprudence, political economy and commerce, and a training school; the academy of the Oriental languages, the museum of the antiquities of Southern Russia, and the botanic garden. Public baths have been established of late years.

In the year 1817 Odessa was declared a free port for thirty years. Though not situated at the mouth of any great river, Odessa, in consequence of its excellent harbour and convenient situation, is the emporium where the surplus produce of southern Russia is collected for exportation, and where foreign products required for the interior are imported. The products brought down the Dniester, the Bug, and the Dnieper, are all exported from Odessa; but because of the difficulties of the river navigation a vast quantity of the corn brought to the town from the neighbouring provinces is conveyed on carts drawn by oxen. The trade of Odessa extends to all parts of the Mediterranean and western Europe. The chief exports are—corn, tallow, linseed, wool, iron, hides, copper, wax, caviar, potash, beef, furs, cordage, sailcloth, tar, butter, isinglass, &c. The imports consist of coffee, sugar, and other colonial products; cotton, silk, and woollen goods; oil, wine, brandy, spices, dyestuffs, tobacco, fruits, raw cotton, tin, cutlery, timber, &c. In ordinary years about 800 foreign ships enter and leave the harbour; the value of the imports is close upon a million sterling, that of the exports is hard upon two millions annually. The trade of Odessa has increased greatly within the last few years—a circumstance which is no doubt in a great measure but not altogether owing to the failure of the crops in Western Europe, and the consequent demand for foreign supplies. In the first *six months* of 1846, 590 foreign ships arrived with imports to the value of £588,833 13*s.* 4*d.*; and 529 departed, carrying away, besides other articles, 616,324 quarters of corn, nearly all wheat, while the total value of the exports for the six months amounted to £1,267,539 5*s.* In the first *six months* of 1847, 709 foreign ships arrived with imports worth £893,917 13*s.* 4*d.*; and 734 sailed with 1,056,493 quarters of corn, and a total value of exports amounting to £2,716,969 13*s.* 9½*d.* The exports are usually more important during the last six months of the year. The privileges of a free harbour are continued to Odessa till Aug. 27, 1854, by an imperial ukase issued July 29, 1849. Odessa has considerable breweries, distilleries, and manufactories of woollens, silks, tobacco, soap, and candles.

ODEVAERE, JOSEPHUS DIONISIUS, was born at Bruges, Oct. 2, 1778. He was intended by his parents for mercantile pursuits; but evincing a talent for art, he was placed in the Academy of Bruges, in which he obtained the first prize for drawing in 1796. He went the following year to study at Paris, and in 1804 obtained the grand prize of the French Academy of Painting, for a picture of the death of Phocion, and was presented to the Emperor Napoleon. In 1805 he went as a pensioner of the French government to Rome, whence he sent an historical picture to the French Academy; the subject was the Coronation of Charlemagne, and it was generally admired. In 1814 he established himself in Brussels, where he painted his pictures of the Peace of Utrecht and the Battle of Waterloo for the King of the Netherlands, who created Odevaere his court painter. The Battle of Waterloo was followed, in 1820, by the battle of Nieuwpoort, and a Narcissus, engraved by Vlamynck. He produced various other works, among which were many scripture subjects and altar-pieces for churches. He died at Brussels, Feb. 1830.

ODIHAM. [HAMPSHIRE.]

ODIN, or OTHIN, was the principal deity of the ancient Scandinavians and Northern Germans. 'Wodan,' or 'Gwodan,' was another form of the name of Odin. Odin is represented by some as the god of war, the Mars of Scandinavian mythology. Among the Anglo-Saxons, Wodan was the god of merchants, corresponding to the Hermes of the Greeks. The fourth day of the week, Wednesday, derived its name from this deity.

In all the Scandinavian traditions preserved by the chroniclers, mention is made of a chief, called Odin, who came from Asia, at some unknown time, with a large host of people called Aser, and conquered Scandinavia, where he built a city called Sigtuna, with temples, and established a worship and hierarchy; he also invented or brought with him the characters of the Runic alphabet; he was in short the legislator and civiliser of the North. He is represented also as a great magician, and was worshipped as a god after his death, when some of the attributes of the mythological Odin were ascribed to him.

Wodan, or Odin, was worshipped by the Saxons, the Alemanni, the Longobards, and other German nations, until their conversion to Christianity.

ODO'ACER. After the two rival emperors Glycerius and Julius Nepos were driven from the throne, Orestes, a soldier from Pannonia, clothed his own son Romulus with the imperial purple, but retained the authority in his own hands. The barbarian troops now asked for one-third of the lands of Italy as a reward for their services; but Orestes having rejected their demand, they chose Odoacer, a Goth, for their leader, who marched against Orestes, who had shut himself up in Pavia. Odoacer took the city by storm, and Orestes was carried prisoner to Placentia, where he

was executed, in August, A.D. 475. [NEPOS, F. J.] Romulus was banished to a castle of Campania, and Odoacer proclaimed himself king of Italy. The Western Empire is considered as having ended with the deposition of Romulus. Odoacer's authority did not extend beyond the boundaries of Italy. Theodoric, king of the Ostrogoths, having marched from the banks of the Danube, and defeated Odoacer near Aquileia, Odoacer shut himself up in Ravenna, A.D. 489. He was finally compelled by famine to surrender Ravenna (March, 493), and he was put to death. Theodoric then became king of Italy.

ODYSSEY. [HOMER.]

ŒCUMENICAL COUNCILS. [COUNCIL.]

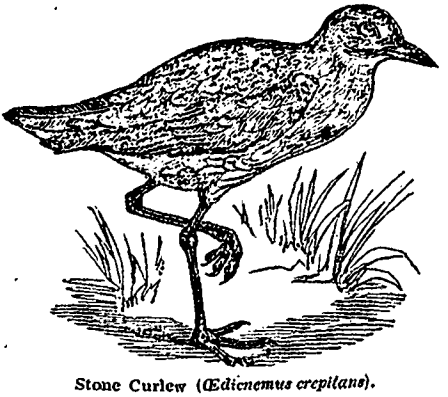
ŒCUME'NIUS was bishop of Tricca in Thessaly. He is generally placed in the 9th century. He wrote commentaries on the 'Acts,' on St. Paul's fourteen Epistles, and on the seven Catholic epistles (and perhaps on the 'Revelations'), containing besides his own observations, the remarks of other writers. The best editions of his works are those of Verona, 1532, and Paris, 1631.

ŒDEMERA. [STENELYTRA.]

ŒDENBURG. [HUNGARY.]

ŒDICNE'MUS, a genus of Plovers (family *Charadriadæ*, order *Grallatores*), regarded by most naturalists as constituting a transition link between the more typical Plovers and the Bustards. Five or six species are known, confined entirely to the regions of the Old World—(Europe, Asia, and Africa).

As an example of this genus we may instance the Common Thick-Knee, Stone Curlew, or Norfolk Plover (*Œ. crepitans*), one of the summer



Stone Curlew (*Œdicnemus crepitans*).

visitants to our island. This species arrives in our country about the end of April or the beginning of May; and in autumn, collecting into vast flocks composed of adults and young, retires to Africa or the warmer latitudes of the European continent to pass the winter. The Stone Curlew frequents wide open tracts of country or hilly downs, and is particularly abundant in Norfolk, Suffolk, and Sussex; it occurs also in Hampshire and the wolds of Yorkshire. It is very rapid on foot and powerful on the wing, executing its flight in wide circles, and is not to be approached by the sportsman without difficulty; sometimes however it will squat in places favourable to its colour till it is almost trod on. The large and prominent eye of this bird indicates it to be a late feeder; evening is in fact its natural period of activity, and it may be then heard uttering its loud and shrill whistle. Worms, reptiles, insects, and even small mammalia, are its ordinary food. The eggs, two in number, are laid on the bare ground. The young, covered with down, run immediately from the egg, like partridges, 'and are withdrawn to some flinty field by the dam, where they skulk among the stones as their best security; for their down feathers are so exactly of the colour of our gray spotted flints, that the most exact observer, unless he catches the eye of the young bird, may be eluded.' This species has a wide geographical range in the Old World, being found in Spain, France, Italy, Germany, &c., Africa, and Asia. The young are in request for the table.

OELS. [SILESIA.]

ŒNANTHE, a poisonous genus of apiaceous or umbelliferous plants, one of which, the *Œ. pimpinelloides*, appears to have been the οἰνάνθη of Theophrastus and Dioscorides. The species are all inhabitants of damp meadows or watery places, and are common in Europe. The most important is *Œ. crocata*, an inhabitant of ditches, banks of rivers, and similar situations. Cases of accidental poisoning with this plant, in consequence of its roots having been mistaken by ignorant people for ground-nuts, parsnips, &c., are not uncommon.

ŒNOTHE'RA, a genus of plants belonging to the natural order *Onagrariæ* or *Onagraceæ*. *Œ. biennis*, Evening Primrose, has large, numerous, and bright yellow flowers. The roots are eatable, and were formerly taken after dinner to flavour wine as olives now are. Therefore the generic name was changed from *Onagra*, the Ass-Food, to *Œnothera*, the Wine-Trap. This is the only British species of the genus. There are 85 species enumerated by Don, growing chiefly in North America. They are handsome border flowers, and deserve to be cultivated, but are not valuable on account of any properties they possess.

OESEL, an island in the Baltic, situated between 58° 0′ and 58° 40′ N. lat., 21° 40′ and 23° 5′ E. long., stretches across the entrance of the Gulf of Livonia, or Bay of Riga. It extends from S. by W. to N. by E. about 45 miles, with an average width of 25 miles; a narrow peninsula extends from its south-western corner about 20 miles southwards. The surface is uneven and rocky, but it is covered with a good layer of vegetable mould. The winters are much less severe than on the adjacent continent. The island yields corn, flax, hemp, a little tobacco, and very good pasture. The inhabitants, who are Esthonians, amount to 35,000. The island belongs to the government of LIVONIA, of which it constitutes the circle of ARENSBURG.

ŒSO'PHAGUS, or Gullet, is the canal leading from the pharynx, the short cavity at the back of the mouth, to the stomach. In man it is composed of two layers of muscular fibres, an external

longitudinal layer, and an internal, composed of circular fibres, by which the food is propelled towards the stomach, and which are lined by a layer of soft mucous membrane and a moderately thick cuticle continued from that of the lips and mouth.

ŒSTRIDÆ, a family of Dipterous Insects of the section *Athericera*, distinguished by the proboscis being either in a rudimentary state or wanting; the palpi are sometimes distinct and occasionally wanting: the antennæ are short, inclosed in a cavity in the fore part of the head; the third joint is usually globular, and the stylet is usually dorsal; the abdomen is generally large; the wings have generally three posterior cells, of which the first is often closed.

It will be seen from the above definition that the Œstri of the moderns cannot be the same as the Œstrus (*οἶστροι*) of the ancient Greeks, a fly, which, we learn from Aristotle ('Hist. Anim.,' iv. 4, &c.), Virgil ('Georgics,' iii. 148), Ælian, and others, is armed with a strong tongue (proboscis), pierces the hide and sucks the blood of quadrupeds, and makes a peculiar kind of harsh humming noise. Mr. Bracy Clark states that the *Œstrus Bovis* makes no noise while flying, and Mr. W. S. M'Leay says, 'the *Œstrus Equi* is also silent in flying, as I have repeatedly myself observed.' The absence of the proboscis in some and the rudimentary state in others of the modern *Œstri*, proves that they are not blood-suckers; and this fact is otherwise at variance with the description given by the ancients, their *Œstri* having a strong proboscis, a circumstance which, connected with the blood-sucking habits of the *Tabanidæ*, another family of dipterous insects, induces Mr. M'Leay to imagine that the *Œstrus* of the ancients belongs to that group. An ingenious paper on this subject, by the gentleman last mentioned, will be found in the 14th volume of the 'Linnæan Transactions.'

The modern *Œstridæ* are certain flies, the larvæ of which are well known by the name of Bots.

The genera are somewhat numerous (*Histoire Naturelle des Insectes Diptères*, by M. Maquart, in 2 vols., forming part of the *Suites à Buffon*).

ŒSTRUS. [Bots.]

ŒTA, MOUNT. [Thessaly.]

ŒTHRA, Dr. Leach's name for a genus of Brachyurous Crustaceans, placed by M. Milne Edwards as the representative of his first division (*Cancériens Cryptopodes*) of his tribe *Cancerians;* and indeed his *Cryptopod Cancerians* are composed of this genus solely. Latreille made *Œthra* and *Calappa* form the family *Cryptopoda;* but M. Milne Edwards is of opinion that the only character which they have in common with the latter is the existence of lamellar prolongations on the sides of the carapace, dispositions which are also found in certain *Leucosians*, whilst all the rest of their organisation approaches that of the *Crabs*.

Place in the System.—M. Milne Edwards is of opinion that this form has great affinity with the genus *Cryptopodia* belonging to the family of *Oxyrhynchs*, and that it establishes the passage between those crustaceans and the other *Cancerians*, at the same time that it approaches *Calappa*, whose natural place is in the family of *Oxystomes*.

Example.—*Œthra scruposa*. Length two to three inches. Colour grayish.

Locality, Isle of France and Indian Archipelago.

OETTINGEN, formerly an independent county in the north part of Swabia, now belongs partly to Bavaria and partly to Würtemberg. Its area is 328 square miles, and the population above 57,673. It is a very fertile country, watered by the rivers Wernitz and Eger, and produces corn, hemp, flax, and timber. It has a good breed of horned cattle and horses, and is particularly famous for its geese. It has likewise iron, saltpetre, and remarkably fine stone for building. The county is now divided between the princes of Oettingen-Spielberg and Oettingen-Wallerstein, whose common ancestor, Louis XV., lived at the time of the Reformation, and who reside respectively at Oettingen on the Wernitz, which has a population of 3280, and at Wallerstein a small market-town, with 1560 inhabitants.

OFANTO. [Capitanata.]

OFEN. [Buda.]

OFFENBACH, a town in Hesse Darmstadt, is situated in a very fertile country, 2¾ miles by railroad E.S.E. from Frankfort, on the left bank of the Maine, and has 8000 inhabitants. It consists of the old and the new town, the latter of which is well built. Offenbach is a commercial and manufacturing town. The principal manufactures are leather, hats, silks, hosiery, earthenware, all kinds of lacquered goods, gold and silver wire, jewellery, snuff and tobacco, wax candles, white-lead, chocolate, and travelling carriages.

OFFERINGS, OBLATIONS, and OBVENTIONS are not only those small customary sums paid at Easter, but also the customary payments for marriages, christenings, churchings, and burials. By the Small Tithe Act, 7 & 8 Wm. III. c. 6, offerings, oblations, and obventions may be recovered before justices of the peace.

Surplice-fees are payable for every marriage, whether by banns or license; and for every funeral, churching, or christening, according to the custom of the parish. Mortuaries are claimed on the death of each person in a parish, according to value of property left, but not to a greater amount than 10*s*.

OFFICE FOUND. When the king is entitled to take possession of real or personal property previously belonging to a deceased person, the facts upon which the king's title accrues must be first ascertained by an inquisition or inquest of office. This inquiry is executed by some officer of the crown, such as the escheator, coroner, or sheriff, or persons specially commissioned for the purpose, and the facts are ascertained by a jury, consisting usually of twelve men. When an inquisition of this kind has been executed and returned, it is said to be *an office found*. Thus, if a person of illegitimate birth dies intestate, the king (if he is the immediate lord of the fee), upon office found, is entitled to all his land.

OFFICE, HOLY (*Sanctum Officium*), is the name of an ecclesiastical tribunal established in

the 13th century by popes Honorius III., Gregory IX., and Innocent IV., to try heretics, blasphemers, apostates, relapsed Jews or Mohammedans, witches and wizards, polygamists, and other persons charged with infractions of the canons of the Church. The judges of this court were called Inquisitors, whence the tribunal itself has been commonly styled the 'Holy Inquisition.' The name of inquisitors, or inquirers after heretics, appears as early as the time of Theodosius I., previous to whose reign there had been no specific law making heresy a capital offence.

It was about the year 1233 that Pope Gregory IX. laid down the rules and defined the jurisdiction of the inquisitors' courts, which he sent to various countries, under the name of Inquisitorial Missions. He introduced the Inquisition into Rome as well as other parts of Italy, and entrusted its powers to the Dominicans, but it was a long time before it was established as a distinct and permanent court. The first inquisitor, Pietro du Verona, a Dominican monk, was sent into Lombardy, where he caused many heretics to be burned, but was himself assassinated in 1252. Shortly afterwards the Inquisition set about discovering private and silent heretics, and having once established the principle that it was necessary to ferret out, as it were, all individuals who dissented from the orthodox church, all means were thought lawful for that purpose. Hence a system of secret and even anonymous denunciations was encouraged, domestic privacy was invaded, acts innocent in themselves were construed into guilt, and ample opportunities were given to private malice and revenge, as the informers were safe from the risk of discovery. The witnesses summoned for the prosecution were not informed of the subject on which they were called upon to give evidence. Nor was the prisoner at his preliminary examination made acquainted with the charges against him. He was obliged to choose for his counsel one among the list of the Inquisition lawyers; and denial or impenitence were almost uniformly followed by torture or the stake. A full account of these proceedings will be found in Llorente ('Complete History of the Spanish Inquisition,' chap. ix.), and in Limborch ('History of the Inquisition,' book iv.).

The Inquisition was first established in Spain by Ferdinand and Isabella, in 1480; but the pope afterwards reserving to himself the right of appointing its officers, conferred upon Thomas de Torquemada, prior of the Dominican convent of Segovia, the dignity of inquisitor-general of Castile and Aragon, with full jurisdiction over all other inquisitors in Spain and its dependencies. Ferdinand also appointed a royal council of the supreme Inquisition, 'Consejo de la Suprema Inquisicion,' of which the grand-inquisitor was president of right and for life, and a bishop and two doctors-at-law were councillors. He was a power placed between the king and the pope, and was in reality independent of them both. The councillors had a deliberative vote in all matters of civil law, but the president alone judged in matters which concerned the canon or ecclesiastical law.

Torquemada and his two assessors framed the organic laws of the new tribunal, which were styled 'Instructions,' and were partly based on the older 'Directorium Inquisitorum.' They are given at length by Llorente, in the 6th chapter of his History. New articles were added to them in 1488 and 1498, and lastly the inquisitor-general Valdez, in 1561, compiled a new series of ordinances in 81 articles, which regulated ever after the practice and proceedings of the Spanish Inquisition. They are also given by Llorente in the 22nd chapter of his work. The Spanish Inquisition was not introduced into Milan or into any other Italian state, with the exception of Sicily.

The court of the Inquisition, as it was established in the 16th century, in Tuscany, Venice, Milan, Parma, and other Italian states, consisted of one inquisitor, sent from Rome, with assessors approved by the sovereign of the respective states, who appointed deputies or commissioners to attend the trials and report to him. The sentences of the court were subject to the sanction of the temporal sovereign.

The tribunal continued to exist in Tuscany till the reign of Leopold of Austria, who abolished it in 1787. About the same time it was suppressed at Milan by the Emperor Joseph II. In 1769 the Duke of Parma abolished it in his territories.

Sixtus V., in 1588, having distributed the cardinals into fifteen congregations or boards, made that which was styled 'Holy Roman and Universal Inquisition' to consist of twelve cardinals with several prelates as assessors, including the Master of the sacred palace, several monks with the title of 'consultors,' besides other clergymen and lawyers called 'qualificators,' whose business it was to prepare the cases. This is the Inquisition which existed at Rome up to the abdication of the pope in 1848; but its jurisdiction did not extend beyond the limits of the Papal State, and it is generally understood that its powers were exercised with considerable leniency and caution. Pius VII., after his restoration, is said to have abolished the use of the torture. Since the overthrow of the Roman Republic, and the restoration of the pope (1849), the tribunal has been re-established. It has now no existence elsewhere. In Spain it was finally abolished by the Cortes in 1820; in Germany and Poland it had been long since suppressed; and in France it never had any authority whatever.

OFFSETS are lines drawn perpendicular to the chord of an arc, or the longest base of an irregular polygon, from points in the arc, or corners of the polygon.

OGGIO'NE or UGGIONE, MARCO DA, a Milanese painter and scholar of Lionardo da Vinci, was born about 1470. Oggione's frescoes, now at Milan, are praised by Lanzi, but he is chiefly known for his copy of the 'Last Supper' of Leonardo da Vinci, now in the Academy of Arts in London. This copy is painted in oil, and was executed about 1510 for the Refectory of the Certosa di Pavia; and as it was copied when the original was in a perfect state, the decay of the latter renders it very valuable.

OHIO, River. [MISSISSIPPI, River.]

OHIO, one of the United States of North America, lies between 38° 30′ and 42° N. lat., and 80° 30′ and 84° 50′ W. long. It extends from E. to W. 220 miles, and from N. to S. from 93 to 200 miles; its average breadth may be 182 miles. It is bounded W. by Indiana, N. by Michigan and Lake Erie, E. by Pennsylvania, S.E. by Virginia, and S. by Kentucky. The area is 40,000 square miles. The population in 1840 was 1,519,467, of whom none were slaves.

Surface and Soil.—The surface of this state may be divided into the hilly region and prairie region. The hilly region comprehends the eastern and southern districts, and may be considered as separated from the prairie region by a line commencing at the most N.E. point of the state on Lake Erie, and running in a S.S.W. direction to Zanesville on the river Muskingum, whence it extends due W. and terminates on the boundary-line of Indiana near Eaton. Each region occupies about half the area of the state. The hilly region contains some level and low land along the Ohio, but the level land does not extend more than one mile and a half from the bank of the river. It is very fertile, though in some parts swampy and subject to inundations. Behind this level tract the country rises suddenly into steep hills, which in general range between 300 and 500 feet above the level of the river. From the summit of these hills the country extends in an uneven hilly plain furrowed by valleys. The hills are comparatively small, though very steep. Their summits form level plains of moderate extent. The general elevation of these uplands varies from 800 to 1000 feet above the sea-level. The soil of the valleys is very deep; that of the uplands is not so deep, though more so than is usually found in hilly regions. The prairie region is an extensive, elevated, and tolerably level plain. It contains no hills of any great magnitude, but has numerous swells, some of which are extensive. Other parts contain large tracts of flat country, where scarcely an undulation of the surface can be discovered. The general elevation of this region hardly exceeds 1000 feet. This plain contains the watershed between the rivers which run southward to the Ohio and northward to Lake Erie; and its surface presents an alternate succession of woodlands and prairies. Along the south-western shores of Lake Erie there is an extensive tract covered with a deep swamp, called Black Swamp. The valleys are generally very fertile.

Rivers and Canals.—The river Ohio runs along the eastern and southern boundary-line of Ohio. The Muskingum, the Scioto, the Great Miami, and Little Miami, are all affluents of the Ohio. [Mississippi, River.] The Maumee, the Sandusky, and the Cuyahoga, fall into Lake Erie.

The Erie Canal extends from Cleveland, on Lake Erie, 307 miles, to Portsmouth, on the Ohio. The Miami Canal extends from Cincinnati, 178 miles, to Defiance, where it meets the Wabash and Erie Canal. There are other smaller canals.

Climate and Productions.—In comparing the climate of Ohio with that of England, it appears that the climate of Ohio is colder in winter and warmer in summer. The mean annual temperature at Cincinnati on the Ohio is 53.56°, or about 3.56° higher than that of London. The mean temperature of the winter at Cincinnati is 36°, at London 39.3°. Most of the rivers, including the Ohio, are covered with ice every winter. The greatest quantity of rain falls in April and May. The mean annual quantity is stated to be 36 inches.

The wealth of Ohio consist in its agricultural productions. Indian corn, wheat, rye, oats, barley, and tobacco, are extensively cultivated. Cotton arrives at maturity only in the districts along the Ohio. Most of the fruit-trees of England succeed well, and especially peaches. The wild grape grows luxuriantly on the southern side of the hills; and several vineyards have been planted, from which pretty good wine is obtained. The cultivation of the grasses is not neglected. Horned cattle and pigs are very abundant, and are driven in great numbers to the Atlantic states for sale, or sent down the Mississippi. Salt pork also constitutes an important article of exportation. Bears and deer are still numerous in the forests, and the flesh of both is dried and cured for sale.

Iron-ore abounds, and is worked in a few places not far from the river Ohio. Bituminous coal exists in extensive strata along the Ohio and some of its confluents, but it is not yet extensively worked. Salt is obtained from springs on the river Scioto.

Manufactures and Commerce.—There are several manufactures of iron, wool, and cotton, though generally on a small scale. At Cincinnati and Cleveland many vessels are annually built, especially steam-boats. In 1840 the exports of the state amounted to 991,954 dollars, and the imports to 4919 dollars.

Antiquities.—The remains of fortifications, which are found in many places west of the Appalachian Mountains, are very numerous and extensive in the State of Ohio. West of Chilicothe, near Cincinnati, and in other places, are found high and thick walls, of the origin of which nothing is known.

Divisions and Towns.—The State of Ohio is divided into 79 counties. The following are the principal towns, with the population of each in 1840:—*Cincinnati*, on the Ohio, is the largest and most commercial city of the state. [Cincinnati.] *Chilicothe*, 45 miles S. from Columbus, is situated on the west bank of the Scioto, and contains a court-house, gaol, 2 market-houses, and 4 churches. Population, 3977. *Circleville*, 26 miles S. from Columbus, is situated on the east bank of the Scioto. The Ohio Canal crosses the river at this place by a fine aqueduct. The town contains 4 churches. Population, 2000. *Cleveland*, a city and port of entry, 146 miles N.N.E. from Columbus, is situated on Lake Erie, at the mouth of the Cuyahoga and at the northern termination of the Ohio Canal. The harbour is one of the best on Lake Erie. Two piers, 200 feet apart, extend each 425 yards into the lake. The city contains a court-house and 8 churches. Population, 6071. The small city of *Ohio*, on the opposite side of the Cuyahoga, is connected with Cleveland by a floating bridge and ferry. The harbour is common

to both, and they may be considered as one town, though they have separate incorporations. *Columbus*, a city and the capital of the state, is situated in 39° 47′ N. lat., 83° 3′ W. long., on the east bank of the Scioto, immediately below the confluence of the Whetstone. It contains a state-house, court-house, state-penitentiary, and 5 churches. Population, 6048. *Dayton*, 68 miles W. by S. from Columbus, is watered by the Great Miami, the Mad River and Wolf Creek, which are made to drive the machinery of several factories, flour-mills, and saw-mills. It contains a court-house, gaol, and 10 churches. Population, 6067. *Lancaster*, 30 miles S.E. from Columbus, contains a court-house, gaol, and 7 churches. It is connected by a branch canal with the Erie Canal. Population, 3272. *Steubenville*, 141 miles E.N.E. from Columbus, is situated on the west bank of the Ohio. It contains a town-house and 6 churches. Population, 5203. *Zanesville*, 54 miles E. from Columbus, is situated on the east side of the Muskingum. It contains a court-house, gaol, county offices, and 9 churches. Population, 4766. A canal and locks round the falls of the Muskingum render the river navigable, and create a great water-power, by which several factories and mills are driven.

History and Constitution.—This country was first visited by the French from Canada in the 17th century, but no settlements were formed till the British from Pennsylvania and Virginia began to occupy the country. The French tried to prevent this by establishing small forts from Presqu'Ile on Lake Erie to the Ohio along the channel of the river Alleghany. This however was considered by the British government as an encroachment, and it led to the war of 1755, by which the French lost Canada, and were expelled from North America. In 1799 the first territorial legislature met at Cincinnati, and organised the government. In 1802 Ohio was made a State, and formed a constitution. The legislature consists of 36 senators, who are elected for 2 years, and 72 representatives, who are elected for one year. The governor is elected for 2 years. Ohio sends 2 senators and 21 representatives to Congress.

OHLMÜLLER, JOSEPH DANIEL, a German architect, was born at Bamberg in 1791. In 1831 he was commissioned to make designs in the gothic style for a church in the Au suburb of Munich. Altogether, this structure is one of the noblest and most successful works in that style which has been produced in modern times in Germany. He erected in the same style the national monument at Wittelsbach and the Otto chapel at Kiefersfelden, the latter of which was begun in 1834, and the other completed in 1835. The church of St. Theresia at Hallbergmoos, begun by him in October, 1833, is in the Italian style. He died at Munich, April 22, 1839.

OHMACHT, LANDELIN, was born near Rottweil in Würtemberg, in 1760. He was the pupil of J. P. Melchior. His first public works were some sculptures for the Kreuzkirche at Rottweil, which still decorate the choir. His principal works are at Strassburg, where he settled in 1801. His first work there was the monument of General Desaix, erected on the Rheininsel near Strassburg: the monument in the church of St. Thomas to Professor Oberlin (1810) is one of his principal works. There are also several classical figures by Ohmacht—a Venus; Psyche; Flora; Hebe; the Judgment of Paris (at Nymphenburg), and others. He died at Strassburg in 1834.

OIL-PAINTING. [EYCK, JOHN VAN.]

OILS are substances obtained from very different sources and under various circumstances. First, animal fats are to be regarded as varieties of oil. There are also animal oils more properly so called, as whale and spermaceti oil. Secondly, there are the oils of vegetable origin, as those of olives and linseed, obtained by pressure, and called fat, fixed, or expressed oils, and those procured by distillation, termed volatile, essential, or ætherial oils. Thirdly, there are various oils produced by heat from animal, mineral, and other bodies, such as Dippel's oil, and naphtha. Lastly, there are certain oils produced by chemical action, as oil of wine, &c. Most fats and expressed oils consist of *olein*, by some chemists called *margarin*, and *stearin*. [OLEIN; STEARIN.]

Animal Oils.—One of the best known and most extensively used of these is common whale or train oil, obtained by melting the blubber of the animal. As met with in commerce, it is of a brownish colour, rather viscid, and has a disagreeable fishy smell and taste. Its specific gravity is about 0.927. Like other oils, it is very combustible, and it is largely employed for the purpose of giving light. *Spermaceti Oil* is obtained from an oily matter lodged in a bony cavity of the head of the *Physeter macrocephalus*, or Spermaceti Whale. When this substance is subjected to pressure in bags, a quantity of pure limpid oil is expressed; and the residue, after being melted, strained, and boiled with a weak solution of potash, is well known by the name of *spermaceti*. Spermaceti Oil consists of—hydrogen, 11.8; carbon, 78.0; oxygen, 10.2. The other animal oils are of less importance.

Fluid Oils.—The *Vegetable Expressed Oils* vary in their properties. *Olive Oil* is yellowish, the odour and taste but slight. Its specific gravity is about 0.916. Olive Oil consists of—hydrogen, 11.5; carbon, 78.0; oxygen, 10.5. *Linseed Oil* is expressed from the seeds of the common flax. When no heat is employed in the pressing, it is more viscid and has a greenish-yellow colour; it is then called in commerce *cold drawn* linseed oil. Its mean specific gravity is about 0.930. Its smell and taste are stronger and more disagreeable than those of olive oil. Linseed oil is largely employed in oil-painting and in varnish-making. *Almond Oil* is of a light yellowish colour, more fluid than olive or linseed oil; its odour and taste are very slight. Its specific gravity is about 0.917. It is employed sometimes in soap-making, and also in medicine. *Castor Oil* is the expressed oil of the seeds of the *Ricinus communis*. When expressed without the assistance of heat, it is transparent and nearly colourless. It is very considerably viscid, and becomes solid when exposed to about 0° Fahr. Its specific gravity is about 0.960.

Solid Oils.—One of the chief of these is *Cocoa-Nut Oil.* It is white, has a slight pleasant smell, and its taste is rather agreeable. Its specific gravity is about 0.910; it melts at 122° Fahr., and of late years it has been employed in soap-making. *Palm Oil* is of the consistence of butter, and of an orange-yellow colour; its smell is agreeable. It melts at about 103° Fahr.

Volatile or *Essential Oils.*—These oils are fluid at the usual temperature, and with few exceptions are obtained by distillation. Essential oils are distinguished principally from the expressed oils by the following properties:—Usually they are more perfectly fluid, more combustible, have an aromatic or fragrant odour, and an acrid taste; they are volatile *per se* without decomposition, and may be distilled with water at 212°, although their boiling-point is much higher. In some instances the volatile oils are obtained by pressure, without the application of heat: this is the case with the oils of lemons, oranges, and bergamot. In general however they are procurable only by distillation, and this is effected by putting the herb or bark into a still with water, when the oil and water are volatilized and condensed together. Like the fixed oils, they appear to contain a harder and a softer principle; the former has been called *stearopten*, the latter *eleopten*.

The most important oils of this class are those of *Turpentine, Lemons, Marjoram, Cinnamon, Cloves,* and *Almonds.*

The oils produced by the agency of heat on animal matter, and those produced by direct chemical action, are few in number.

The extraction of oil from linseed, from olives, and from other vegetable productions, is mostly effected by crushing and pressure, varied in degree according to the nature of the substance, and sometimes aided by heat.

OILS, VEGETABLE, are divided by chemists into fixed and volatile, and the former into such as are drying, fatty, and solid. Both volatile and fixed oils are very extensively diffused through vegetables; the former in almost every part of a plant except the cotyledons of the seed, and the latter in the seeds chiefly, but also in their fleshy covering, as in the olive, some palms, the fruit of *Melia,* and others. Some families of plants abound especially in fixed oil. Among the *Cruciferæ* are mustard-seed, rape-seed, and colza-seed oils, with other species especially cultivated in Europe, India, and Japan, of which some have of late years been imported into this country. Several of the family of *Compositæ* secrete oil in quantities large enough to render it desirable to cultivate them for this purpose alone, as the Sun-Flower and Jerusalem Artichoke; also some species of *Carthamus* or Bastard Saffron, and also the *Verbesina sativa* of India. *Madia sativa* yields Madi Oil, and its seeds are said to contain more oil than any plant introduced into Europe. Most of the *Cucurbitacæ* also, as the melon, gourd, cucumber, and the numerous varieties, cultivated especially in India, contain a large proportion of oil, which is expressed in the east, as it formerly was in Europe. The *Rosaceæ* also store up a large proportion of oil in the kernels of their fruit, as in the almond, the apricot, as well as the Briançon apricot, and other species of *Prunus.* In the Himalayas oil is also expressed from the apricot kernel, and has been sent to this country, of a fine quality. Among the *Amentaceæ* several species yield oil of good quality, and in sufficient quantity to repay the expense of expression, as hazel-nut oil, beech-nut oil, and walnut oil. Besides these poppy oil, Ben-nut oil (*Hyperanthera*), ground-nut oil (*Arachis*), physic-nut oil (*Jatropha*), are well-known. The cotton-seed yields oil, and also the seeds of the tea-plant, especially of the species called *Thea oleifera,* and some of the Camellias. Other solid vegetable oils are better known. [Cacao; Cocos; Croton; Elæis; Olea Europæa; &c.] The various substances known as vegetable butters are only forms of fixed oil. [Bassia.]

OISE, a department in France formed out of portions of Ile-de-France and Picardie, is bounded N. by the department of Somme, E. by that of Aisne, S. by Seine-et-Marne and Seine-et-Oise, and W. by Eure and Seine-Inférieure. It is nearly of the form of a parallelogram, measuring about 60 miles from E. to W., and 40 from N. to S. Its area is 2249.4 square miles, and the population in 1846 was 406,028, which gives 180.5 to the square mile, being 6.75 above the average per square mile for the whole of France.

The department lies almost entirely in the basin of the Oise, which has a general inclination to the south-west: a narrow zone along the northern boundary slopes northward towards the Somme; a broken hilly country, which forms the western part of the arrondissement of Beauvais, and separates the valley of the Thérain from the Norman district of *Bray,* is drained by the Epte, a feeder of the Eure. A small portion of the south-east of the department is traversed by the Ourcq. The general surface presents extensive plains, with here and there masses of isolated hills; along the left bank of the Oise there is a chain of hills; and another runs close along the northern boundary, forming part of the watershed between the basins of the Somme and the Seine.

The department is named from its chief river—the *Oise,* the ancient *Isara,* which rises in the forest of Thierache, near Chimay, in the Belgian province of Hainault, within 3 miles of the French frontier. Having entered France, its general course is south-west across the department of Aisne, wherein it becomes navigable at Chauny; and continuing in the same direction across the department of Oise, in which it passes Noyon, Compiègne, and Creil, it enters Seine-et-Oise, and throws itself into the Seine at Conflans-Sainte-Honorine, a few miles below Pontoise. Its whole course is 137 miles in length, 75½ of which are navigable, and form the important highway of the water communication to which the canals that unite the basins of the Somme, the Seine, and the Escaut converge. The principal feeders of the Oise from the left bank are—the Ton, the Serre, the Lette, the Aisne [Aisne], the Autonne, and the Nonette; from the right bank—the Noirieu, the Brêche, and the Thérain.

The soil of the plains is in general good, con-

sisting of a strong calcareous clay, mixed in some places with flints and gravel. There is also a good deal of light sandy soil and some arid sandy flats, which are either totally barren, or covered with stunted underwood; the hills, on which the soil is thin and light, are in many parts overgrown with forest trees. There are extensive marshes in the valleys of the Oise and the Thérain.

The temperature is pretty equal all over the department; the climate is healthy, but rather damp, the winters being commonly long and rainy; snow sometimes lies for a month in the north of the department.

The agricultural products are wheat, mixed grain, rye, barley, oats, pulse, potatoes, and some buck-wheat. Of wheat and oats, with which the greatest breadth of land is sown, the yield in ordinary years is about 400,000 and 450,000 quarters respectively. The land is cultivated carefully, but without any regular system. A surplus over the home consumption, amounting to about one-fifth of the gross produce, is exported. Other objects of culture are hemp, flax, chicory, onions, artichokes, turnips, carrots, and a vast quantity of other pot-herbs for the supply of the Paris markets. Rape, poppy, and other oleaginous plants are grown. Some maize and beet-root are grown in the arrondissement of Senlis. The vine is cultivated in several districts of the south and east; but in general the summer heat has too little intensity and too short duration to give the proper degree of ripeness to the grape. The wine of the department is therefore bad, and the breadth of land under vines is diminishing yearly. Cider and eating apples, and prodigious quantities of black and red cherries, are grown. The apple-trees are planted in rows along all the highways, and in the fields they are often grown in quincunxes. Cider is the common beverage of the country people.

The horses and horned cattle are of middling size. A great number of calves and fat cattle are supplied to the Paris markets; in the hilly country west of the valley of the Thérain, cattle-feeding is the common occupation of the people, and a good deal of cheese and butter is made. The common breed of sheep is not good; but in some districts a cross with Spanish merinos has produced an improved stock, with a good carcass and a heavy fine fleece. Poultry is abundant. The usual wild animals and game are common; the wolf and wild-cat are seen, but rarely. The wild swan, the crane, and the stork are among the birds of passage. The black eagle, a rare bird, inhabits the forests of Compiègne.

The manufactures of the department are various; the principal of them are broadcloth, tapestry, carpets, blankets, and other woollen textures for which Beauvais has been long famous. Linen, printed cottons, duck, lace, small wares, mirrors, spectacle glasses, toys, fancy cabinet work and turnery, porcelain, pottery, beet-root sugar, paper, beer, ropes, tiles, bricks, leather, &c., are among the other industrial products. The various agricultural and industrial products of the department find ready outlets by the Oise, the Ourcq, and the canals connected with them. About 200 fairs are held in the year.

Iron is found in some places, but no mines are worked: building stone, mill-stone-grit, paving granite, chalk, marl, potter's and porcelain earths, and fossil marble are found.

The department is crossed by 13 national, 28 departmental, and 29 parish roads; and by the Paris-Amiens Railroad, which traverses it from S. to N., sending off a branch to the north-east from Creil up the valley of the Oise to St-Quentin.

The department contains 1,439,613 acres, distributed among 80,535 proprietors, and into 1,037,000 parcels. Of this area 962,478 acres are under the plough; 73,956 are meadow and grass land; 247,228 are woods and forests; 38,026 are nurseries, orchards, and gardens; 38,819 are barren heath and moor; 44,144 are covered with buildings, roads, streets, &c.; and 24,921 with rivers, marshes, canals, &c.

The department is divided into 4 arrondissements, which with their subdivisions and population are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Beauvais . .	12	244	133,837
Clermont . .	8	178	90,817
Compiègne .	8	165	98,807
Senlis . . .	7	129	82,567
Total . .	35	716	406,028

Of the arrondissement of Beauvais and of the whole department the capital is BEAUVAIS. *Grandvilliers*, 17 miles N. by W. from Beauvais, at the intersection of the great roads to Rouen, Calais, Amiens, and Paris, though a small place of only 2000 inhabitants, has important manufactures of woollen cloth, serge, hosiery, soap, oil, &c.; and a considerable trade in corn, brandy, cider, charcoal, horses, and cattle. *Meru*, 15 miles S. from Beauvais, is the centre of a large manufacture of fancy goods, such as fans, billiard balls, pearl buttons, dominoes, button moulds, chessmen, fancy work-boxes, dice, metal clasps, toys, &c.; it has 2237 inhabitants.

The arrondissement of Clermont is named from its chief town *Clermont*, or *Clermont-Oise*, which is prettily situated on the summit and slopes of a hill 16 miles E. by S. from Beauvais, on the Paris-Amiens Railroad, and has a population of 4192. The site of the old fortifications is now covered with modern buildings and alleys of trees; of its defences there remains only the ancient castle of the Prince of Condé, which stands on the top of the hill and commands a magnificent view over one of the richest parts of Picardie. This castle has been, since 1826, a central prison for female convicts. The town has a college, a tribunal of first instance, linen and cotton manufactures, saltpetre works, breweries, tanyards, bleachworks, besides a considerable trade in corn, fruit, and cattle. *Breteuil*, 18 miles by railway N. from Clermont, is an ill-built town, with 2399 inhabitants, who

manufacture soldiers' shoes, shawls, serge, woollen stockings, paper, leather, and pottery. The vast buildings of the Abbey of Sainte-Marie, rebuilt in 1028 and still entire, form the only remarkable object in the town. About half-a-mile S.E. from Breteuil a piece of ground, on which the remains of ancient walls, besides Celtic and Roman coins have been found, is said to be the site of the *Bratuspantium* of Julius Cæsar ('Bell. Gall.' ii. 13). *Crèvecœur*, a few miles W. from Breteuil, is a small manufacturing town, with a population of 2394. *St.-Just-en-Chaussée* and *Liancourt*, both stations on the Paris-Amiens Railroad, are small places of about 1400 inhabitants. *Mouy*, prettily situated between two hills in a valley watered by the Thérain, is a bustling little town with 2700 inhabitants, who manufacture woollen cloth for soldiers' uniforms, serge, merinos, woollen yarn, &c.

The arrondissement of Compiègne takes its name from the chief town COMPIE'GNE. *Noyon*, said to be the ancient *Noviodunum*, and under the Roman Empire *Noviomagus*, is a well-built town situated on the slope of a hill surrounded by gardens, and on the Vorse, a feeder of the Oise, 14 miles N.E. from Compiègne, and has 5950 inhabitants. The town, which is entered by 4 principal gates, has a fine cathedral church, built by Pepin-le-Bref, and a large town-hall, which dates from 1499. It has some trade in corn, linen, canvass, and leather. Noyon is the birth-place of Calvin.

In the arrondissement of Senlis the chief town *Senlis* is situated on the slope of a hill, 29 miles S.E. from Beauvais, and has a tribunal of first instance and 5320 inhabitants. The town, which stands near the junction of the Nonette and the Aunette, two small streams that form a feeder of the Oise, consists of an ancient part or city and three suburbs. The city occupies the site, and contains some remains, of a Roman town, also a castle built in the time of St.-Louis, and a handsome cathedral church. The houses of the town are well built, but the streets are mostly narrow and crooked. There are cotton-spinning factories, tanyards, printing offices, linen-bleaching works, and chicory-mills in the town, and fine stone quarries and lime-kilns in the environs. *Creil*, 6 miles N.W. of Senlis, at the junction of the railroads from St.-Quentin and Amiens to Paris, stands on the left bank of the Oise, and has about 2000 inhabitants, many of whom are engaged at the extensive potteries and porcelain works near the town. About 5 miles S. from Creil, and about a mile E. of the Paris-Amiens railroad, is *Chantilly*, a pretty little town with 2446 inhabitants, situated on the Nonette, near an extensive forest, to which it gives name. Chantilly is one of the principal centres of the lace manufacture in France; both the common flaxen lace, and that made of silk, and called *blonde*, are extensively manufactured. The royal park, palaces, and waterworks of Chantilly, were formerly famous all over Europe. During the first Revolution the palace built by the great Condé was sold and demolished, its contents having been first removed to Paris. Since the Restoration the ruins have been concealed from view by plantations, the smaller palace repaired, and great improvements made; so that the palace, with the magnificent gardens, grounds, and sheets of water, that surround it, still constitute a domain worthy of the admiration of foreigners and of the national pride. The hospital of Chantilly, founded by the princes of Condé, is a beautiful mass of building, and one of the best-regulated establishments of the kind in France. *Crépy*, or *Crespy-en-Valois*, 14 miles N.E. from Senlis, formerly the capital of Valois and a royal residence, is remarkable only for the ruins of its former structures and fortifications. It has 2873 inhabitants, who trade in corn, household linen, and thread. The former Ursuline convent is now a cotton factory. *Pont-St.-Maxence*, 7 miles N.E. from Creil on the St.-Quentin railroad, is a well-built market-town, with clean well-paved streets, and 2455 inhabitants. It stands on the Oise, which is here crossed by a fine stone bridge.

The department forms the see of the bishop of Beauvais: is included in the jurisdiction of the High Court, and in the circuit of the University-Academy of Amiens; and belongs to the 1st Military Division, of which Paris is head-quarters. Under the monarchy it returned 5 members to the Chamber of Deputies; it now has 8 representatives in the Legislative Assembly.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

O'KEEFFE, JOHN, was born in Dublin, on the 24th of June, 1747. Being designed for a painter, he was placed, when only six years old, under the charge of Mr. West at the Royal Irish Academy; and his literary education, in Greek, Latin, and French, was received from Father Austin, a learned Jesuit. At the age of sixteen he had composed a comedy; and when he was no more than eighteen, another comedy of his was brought out by Mossop, at the Smock-Alley Theatre in Dublin. His dramatic turn now took entire possession of him. He obtained an engagement from Mossop as an actor, and continued for some years to be a member of the company; acting both in Dublin and in other towns of Ireland. At the same time he exercised himself in dramatic writing, often producing small pieces for his own benefits and on other occasions. From the year 1781 he was a play-writer by profession. The fruit of his labours was a collection of dramatic pieces, amounting, on his own list, to no fewer than sixty-eight, of which fifty-six were acted, and many of these with great success. Some of them still keep possession of the stage, as, for instance, his comedy of 'Wild Oats,' and his operatic farces of 'The Agreeable Surprise' and 'Poor Soldier.' O'Keeffe died in 1833.

OKEHAMPTON. [DEVONSHIRE.]

OKHOTSK, a commercial town, situated in 59° 20′ N. lat., 145° 18′ E. long., on the northern shores of a wide gulf of the Pacific Ocean, which separates the peninsula of Kamtchatka from the continent of Asia. The town is built on a low hill on the right bank, and about 3 miles from the mouth of the Ochota. It is a small place with only 2000 inhabitants; but it has a considerable

commerce in Russian and American furs. The harbour, which is frozen up from September to June, is formed by the river Ochota, which has a bar at its mouth with only 9 feet of water.

O'KHRIDA (*Okhri*), a town of Albania, in European Turkey, situated in the basin of the Drin on the north-eastern shore of the Lake Okhrida, the ancient *Lychnidus*, stands near the point 41° 3′ N. lat., 21° 5′ E. long., and has about 6000 inhabitants. The town lies at the foot of an eminence, the summit of which is crowned by a castle, in which the Turkish governor of the surrounding province resides. Silver ore and sulphur are procured from mines near the town. A Greek archbishop resides here.

OLACA'CEÆ. This name applies to a small and little-studied natural order of exogenous plants, chiefly found within the tropics. Its affinities are little understood, but are supposed to be greatest with *Pittosporaceæ*, on the one hand, and *Aurantiaceæ*, on the other. The plants are of little importance for useful qualities; one species, *Heisteria coccinea*, yields, it is said, the Partridge Wood of cabinet-makers, and the fruit of others is eatable when ripe, though not very pleasant.

OLA'US, MAGNUS, a native of Sweden, was an archdeacon in the Swedish church when the Reformation, supported by Gustavus Vasa, gained the ascendancy in Sweden. In consequence of this change Olaus Magnus retired to Rome, where he spent the rest of his life in the enjoyment of a small pension from the pope. At Rome he wrote his work, 'Historiæ de Gentibus Septentrionalibus,' &c., Rome, folio, 1555, and Basel, 1567. The work is minute, and contains some curious information, but is uncritically written. Olaus died at Rome in 1568.

OLBERS, HEINRICH WILHELM MATHIAS, an able physician and a distinguished astronomer of Germany, was born October 11, 1758, at Abergen, near Bremen. Of his private life few particulars have yet been made public; and almost all that can be stated respecting the history of this celebrated individual consists only of a few brief notices relating to his discoveries in the heavens. He had a private observatory in Bremen, in which he made an extensive collection of documents relating to cometography. This library was, after his death, purchased by the Emperor of Russia, and deposited in the observatory of Pultowa.

In 1779 Olbers became known to astronomers by a series of observations which he made on the comet of that year, and by his determination of the elements of its orbit: he computed also the orbits of the comets which appeared in 1781 and 1795; those of two comets which appeared in each of the years 1798 and 1799, of one in 1802, and of the great comet of 1811.

M. Piazzi, of Palermo, having had, in 1801, the good fortune to discover a planet (Ceres) between the orbits of Mars and Jupiter, Dr. Olbers calculated its orbit approximatively, and was the first to observe it on its reappearance, after having been for a time invisible. On the 28th of March, 1802, being engaged in examining the northern part of the constellation Virgo, he discovered a star which was not in any of the catalogues: this was ascertained to be a new planet, and it received the name of Pallas. Its orbit was soon calculated, and it was found to describe a very eccentric ellipse about the sun at a mean distance from it which is nearly equal to that of Ceres. Dr. Olbers was led, from the fact that these two planets are nearly in the same part of space when they arrive at the places where the planes of the orbits intersect one another, to imagine that they might be dispersed fragments of a large planet which revolved, at one time, about the sun at nearly the same distance from that luminary; but which, in consequence of an internal convulsion, or from some other cause, had been broken up. Pursuing this idea, he considered that there might be other fragments, or small planets, in the same region; and he now determined to make the discovery of new planets a particular object of research. From 1804 to 1807 he persevered in examining with the most minute attention, at the times of their opposition to the sun, the parts of the heavens which were near the nodes of the other planets; and, on the 29th of March, in the latter year, his sagacity and diligence were rewarded by the discovery of another planet, to which the name of Vesta was given. It may be proper to mention that several other planets have since been discovered nearly in the same region.

In 1815 (March 6th) Dr. Olbers discovered, near the constellation Perseus, a comet which presented the appearance of an attenuated nebulosity without any visible nucleus; and he continued to observe it till the end of August, when it ceased to be visible. In 1826 he published a dissertation on the probability that a comet may come in collision with the Earth—a subject which then engaged the attention of astronomers on account of the near approach of the comet Biela when in one part of its orbit.

Dr. Olbers was elected a fellow of the Royal Society of London in 1804, and a Foreign Associate of the Académie des Sciences at Paris in 1829. He died at Bremen on the 2nd of March, 1840.

OLD RED-SANDSTONE. By this title English geologists designate the variable series of rocks which separate the youngest slates from the mountain-limestone and coal. Sir R. I. Murchison has recently proposed the name of *Devonian System* for this series of strata.

The Old Red Sandstone is composed of *conglomerates, sandstones, argillaceous beds,* and *calcareous beds.* The best general series of these rocks known is that unfolded by Murchison's examination of the country along the border of South Wales. That author presents us with the following three groups in a descending order:—

1. Quartzose conglomerate and sandstone. The conglomerates occupy a thickness of about 200 feet, and then pass down into chocolate-brown sandstones, mottled marls, &c.

2. Cornstone formation, including marly clays and a peculiar limestone.

3. Tilestone. Nearest in position to the Silurian

rocks, these laminated sandstones resemble them somewhat both in organic remains and mineral aspect. On the surface they make a red soil, while the upper Silurians yield a gray soil.

Sir R. I. Murchison estimates the total thickness of the old red-sandstone system at not less than 9000 or 10,000 feet. ('Silurian System,' p. 184.)

OLDCASTLE, SIR JOHN, afterwards *Lord Cobham*, was born in the 14th century. He gained military distinction in the French wars under Henry IV. and V., and was a favoured attendant of the latter. Lord Cobham (a title which he subsequently gained by marriage) collected and transcribed the works of Wickliffe, maintained preachers of that persuasion, and became a leader of the reformers. Being summoned to appear before the archbishop of Canterbury, he refused, was excommunicated, and sent to the Tower, from which he escaped into Wales. The clergy got up a report of a pretended conspiracy of the Lollards, headed by Lord Cobham, whereon a bill of attainder was passed against him, and a price of 1000 marks set upon his head. At the expiration of four years he was taken, hung in chains on a gallows in St. Giles's Fields, London, and roasted to death by a fire kindled under him, in Dec. 1417. He wrote 'Twelve Conclusions addressed to the Parliament of England,' and several religious tracts and discourses.

OLDENBURG, or HOLSTEIN-OLDENBURG, a grand-duchy in the north of Germany, consists of three distinct portions. 1. The Duchy of Oldenburg, properly so called, lies between 52° 54′ and 53° 44′ N. lat., and 7° 40′ and 8° 45′ E. long. It is bounded N. by the German Ocean, E. and W. by Bremen and Hanover, and S. by Osnabrück. The area is 2090 square miles. 2. The Principality of Lübeck is surrounded by the duchy of Holstein, and contains 180 square miles. 3. The Principality of Birkenfeld, which is on the left side of the Rhine, contains 170 square miles. It is bounded N.W. and S. by the Prussian province of the Lower Rhine, N.E. by Mesenheim, and S.E. by Lichtenberg. The area of the whole is 2440 square miles.

The Duchy of Oldenburg Proper is a part of the great plain of Northern Germany, without mountains or hills, and without forests. Heaths and moors alternate with cultivated spots. The principal rivers are the Weser, the Jahde, which forms a large bay where it falls into the German Ocean, the Hunte, the Hase, and the Leda. There are no large lakes. The Principality of Lübeck is flat and resembles Oldenburg in its soil and climate, but it contains some beautiful lakes, especially those of Ploen and Eutin. The Schwartau and the Trave are the chief rivers. The Principality of Birkenfeld lies on the side of the mountain-range called the Hochwald, branches of which traverse it, and contain small valleys between them.

Saterland is a district in Oldenburg, 12 miles long, 5 broad, and surrounded on all sides, except the river Sater-Ems, with marshes and heaths. In very dry weather it is possible to enter it from East Friesland on horseback and in light carriages, though this is attended with considerable difficulty. On the other side the ground is not firm, except in the severest frost. The inhabitants, who are all of Frisian descent, still speak their mother tongue and likewise the Westphalian dialect. From their secluded situation, they have retained the manners of their ancestors, and are in this respect a very remarkable people. At the haymaking season, the morasses are crossed in very light waggons with broad wheels not hooped with iron, and the horses have pieces of board attached to their feet, to prevent them from sinking in.

The chief occupations of the inhabitants of the grand duchy are agriculture and the breeding of cattle. There is scarcely such a thing as a village, the farm-houses lying quite isolated in the centre of the farms. There are no great manufactures, but a good deal of home industry. Oldenburg is extremely well situated for commerce, but the trade is chiefly a coasting trade. The population amounts to 278,909, of whom about three-fourths are Protestants.

The ancient house of Oldenburg is one of the most illustrious in Europe. The Emperor of Russia, the King of Denmark, and the late royal family of Sweden are descended from it. Oldenburg is the original seat of the family. Christian I. founded the town of Oldenburg in 1155, and assumed the title of count. Adolphus, son of Christian III. King of Denmark and Norway, founded the house of Holstein Gottorp. In 1773 the grand-duke Paul of Russia, who was descended from the elder branch of the house of Holstein Gottorp, made a convention with Denmark respecting his share of Holstein, by which he surrendered all Holstein to Denmark, and received in exchange Oldenburg and Delmenhorst, which he immediately transferred to his cousin Frederic Augustus, of the younger branch of Holstein Gottorp. This convention was sanctioned by the Emperor Joseph II., who gave to the two counties the rank of a duchy, and as the house of Holstein Gottorp had ever since 1647 given bishops to the see of Lübeck, he assigned it to that family as an hereditary principality. Except during the short period from 1810 to 1815, the state has remained in this family. The recent disputes between Denmark and Germany (1848-9) have arisen out of the transfer of Holstein to Denmark.

Oldenburg, the capital, in 53° 20′ N. lat., and 8° 11′ E. long., is a well-built town on the navigable river Hunte; the ramparts have been converted into public walks and gardens. The population is 7800, including that of the two suburbs. The palace is a very handsome building with a fine park. There are several public buildings, and a few manufactories.

Birkenfeld, is a market-town on the Zimmerbach; it has a castle and about 1800 inhabitants. There are two iron mines in the neighbourhood, and the town has very considerable fairs for horses. *Oberstein* on the Nahe is also a market-town, and has a castle and about 1500 inhabitants, who are chiefly employed in manufacturing articles in semi-precious stones, and grinding and polishing them.

Varel, on a canal which joins the Jahde, forms a harbour which merchantmen can enter at high-

water: it has 3000 inhabitants. *Jever*, in a fertile country on a navigable canal, has a good trade and 3600 inhabitants. *Eutin*, which is the only town in the principality of Lübeck, is on the bank of a lake, has a palace of the grand-duke with a beautiful park, and 2700 inhabitants.

OLDENBURG, HENRY, was born about 1626, in the duchy of Bremen. He came to England, became tutor to several noblemen, and entered as a student at the university of Oxford. In 1662, the Royal Society having obtained a charter of incorporation, Dr. Wilkins and Mr. Oldenburg were appointed secretaries to the Society. His services, which he rendered with great zeal and ability, were not acknowledged by any remuneration, although Oldenburg was never a wealthy man. He is author of a few papers in the 'Philosophical Transactions,' and of some 'twenty tracts, chiefly theological and political, in which he principally aimed at reconciling differences and promoting peace and unanimity.' (Hutton.) He also translated some Latin and French works into English, which were published under the name of 'Grubendol.' The letters of Oldenburg, dated in 1667, leave no doubt that during some part of that year he was confined to the Tower upon political grounds. He seems to have died in 1678.

OLDHAM. [LANCASHIRE.]

OLDMIXON, JOHN, one of the heroes of the 'Dunciad,' was born in 1673. His authorship appears to have begun with the drama, in which he was thoroughly unsuccessful. His works were numerous, but dull and unlearned; they are chiefly remarkable for their strong spirit of Whig partisanship. In criticism Oldmixon was distinguished for his unscrupulous abuse of Pope and other eminent men of his day, and he had his punishment from Pope. His party-services were rewarded by an appointment to the place of Collector of the Customs at the port of Bridgewater. He died in London in 1742.

OLDYS, WILLIAM, was born in 1687. He was for some time librarian to the Earl of Oxford, and was afterwards Norroy King-at-Arms. He died April 15, 1761, in a state of poverty, caused by his dissolute habits. He was the author of the following works:—'The British Librarian, exhibiting a compendious view of all unpublished and valuable Books in all Sciences, as well in MS. as in Print,' London, 1737, 8vo. A 'Life of Sir Walter Raleigh,' prefixed to Raleigh's 'History of the World,' 1738, folio. A translation of Camden's 'Britannia,' 2 vols. 4to., has been ascribed to him. 'The Harleian Miscellany, or a Collection of scarce, curious, and entertaining Pamphlets and Tracts,' London, 1753, 8 vols. 4to. Among other minor matters, he wrote in the 'Biographia Britannica' the lives distinguished by the signature G.

O'LEA EUROPÆA differs from most trees, except the Sweet Bay (*Laurus nobilis*), some species of *Cornus*, and a very few others, in yielding a fixed oil from the pericarp. The oil which is expressed from the ripe fruit immediately after being collected, is most esteemed, and called Virgin Oil. That which is most highly prized comes from Nice and Genoa. It is the lightest of the fixed oils, and is largely used in the south of Europe as an article of diet, and in the north of Europe for salads and in cookery. When the oil is extracted by a stronger pressure, or by the aid of heat, or after the olives, having been collected into heaps, have remained till a kind of fermentation has occurred, it is the common *Olive Oil*, the properties of which vary in proportion as the fermentation has been of long or short duration. An oil of still inferior quality is obtained, when the husk of the olive, after the former treatment, is boiled in water. This kind is employed solely for the manufacture of soap.

OLEA'CEÆ, so named after the subject of the last article, are monopetalous Exogenous plants. The species of the order best known in this country are—the Olive, or *Olea Europæa*, the Lilac, or *Syringa vulgaris*, the Evergreen Phillyrea of many forms, the Privet, or *Ligustrum*, and the Fringe Tree, or *Chionanthus*; all which correspond in habit and in sensible properties, which latter are very generally bitter and febrifugal.

OLEA'RIUS, ADAM, whose name was OELSCHLAGER, was born about 1600, in the country of Anhalt. He studied at Leipzig, and made considerable progress in mathematics and philology. He was appointed secretary to an embassy sent by Frederic, duke of Holstein, to Russia, for the purpose of opening a commercial intercourse through that country with Persia and India. Having arrived at Moscow, and received the Czar's sanction, they sailed down the Volga into the Caspian Sea, where they were wrecked off Derbent in 1636. They then pursued their journey by land, passing through Ardebil, Sultanieh, Casbin, and Koom. In consequence of this mission the Shah of Persia sent an envoy to the Duke of Holstein. Olearius published a narrative of his journey, 'Muscowitische und Persische Reisebeschreibung,' fol., Schleswig, 1647, with plates. It was translated into French and English. Olearius also published the narrative of Mandelslo's travels to India, which is annexed to the later editions of his own journey; and a 'Chronicle of Holstein,' 4to., Schleswig, 1674. After his return, he was made councillor and librarian to the Duke of Holstein. He died in 1671.

OLEFIANT GAS. [HYDROGEN.]

OLEIC ACID is produced by the action of oils upon potash. It is a colourless oil; its smell and taste are somewhat rancid; its specific gravity, at 65° Fahr., is 0.898. When cooled a few degrees below 32°, it concretes into a mass of needleform crystals. It consists, according to Berzelius, of $C^{70}\ H^{117}\ O^{5}$, in the anhydrous state. It enters largely into the composition of soaps, forming with potash soft soap, and with soda hard soap.

The *Oleates* in general are not crystallisable salts; and those which are not altogether insoluble are mucilaginous before drying; they are usually very fusible. The chief among them are the Oleates of *Potash, Soda, Barytes, Magnesia, Copper*, and *Lead*.

OLEIN, or ELAIN, one of the two constituents of most fats and expressed oils: the other being *Stearin*. Olein has scarcely any taste or smell when procured from oils which possess these properties only in a slight degree. Its specific gravity is 0.98, it solidifies at 27° Fahr., and crystallises in needles.

On account of the very low temperature at which olein congeals, it it is well adapted for lubricating the wheels of watches, and its value in this respect is enhanced by its not readily becoming rancid by the action of the air.

OLEON is a product obtained by distilling oleic acid mixed with wine; it is a liquid without acid properties.

OLERON, ISLE OF. [CHARENTE-INFÉRIEURE.]

OLE'RON, LAWS OF. The laws, or constitutions, or judgments of Oleron, are a capitulary of ancient marine customs written in old French, and bearing the name of Oleron for several centuries, because tradition points to the island so called in the department of Charente Inférieure as the place of their original promulgation. An ancient copy of these laws is to be found in the 'Black Book' of the Admiralty, the original of which is supposed to be in the Bodleian Library; but they are not there called the Laws of Oleron, nor is there any reference in the laws themselves, or in the book which contains them, to their origin or history. They are not unfrequently appended to ancient editions of the 'Coutumier' of Normandy under the title of 'Les Jugemens de la Mer:' in Cleirac's edition of the 'Uz et Coutumes de la Mer' they are given, without any description of the book or place from whence they are taken, under the name of 'Roole des Jugemens d'Oleron.' They are generally referred to by French writers on maritime law as 'Jugemens d'Oleron.' The copies of these laws however published by Cleirac, as well as those appended to the 'Coutumier de Normandie,' differ materially from each other, and also from that in the 'Black Book' of the Admiralty, though many of the articles are almost verbally the same in all. They relate to the rights and duties of shipowners, mariners, maritime contracts, pilotage, port and custom laws, and losses at sea; but are chiefly remarkable at the present day from the circumstance that they were for several centuries adopted by all the nations of Europe as the foundation of their maritime laws. There is no ground for the statement that these laws were made by Richard I. of England at Oleron on his return from the Holy Land; and there are strong reasons for assigning them to a later date than that of Richard I. (Luders' 'Inquiry into the Origin of the Laws of Oleron'). The real origin of these ordinances is not known.

OLIBANUM. [BOSWELLIA.]

OLIVA'REZ, GASPAR GUZMAN, COUNT DUKE DE, descended from one of the most illustrious families of Castile, was born at Rome, about 1587, where his father was ambassador from Philip III., and was educated in the university of Salamanca. When Philip IV., at the age of seventeen, ascended the throne in 1621, Olivarez had so much ingratiated himself with the king that he was intrusted with the management of the affairs of the kingdom.

Guzman displaced his benefactor the Duke of Uceda, and dismissing all the best servants of the people and the king, assumed uncontrolled power. He surrounded himself with worthless favourites, who were mere instruments in his hands. Although his system of government was unjust and arbitrary, a great many public abuses were checked during his administration. But nothing was done to promote the internal prosperity of the country, and the discontent excited by distress at home was increased by the constant failure of the minister's negociations abroad; for, through the influence of Cardinal Richelieu, Olivarez was baffled in every attempt to regain the influence which Spain had once exercised all over Europe.

The unpopularity of Olivarez had become general, when the insurrection of Catalonia and soon after that of Portugal took place, in 1640, in consequence of the minister's attempts to invade the rights of those states. These events, and more particularly his attempts to trample on the privileges of a proud nobility, in which he had only a selfish object in view, were a death-blow to his power. In 1643 he was requested by the king to resign, and, detested by the whole nation, died in 1643, shortly after his disgrace.

OLIVE OIL. [OLEA EUROPÆA; OILS.]

OLIVE TREE. [OLEA EUROPÆA.]

OLIVER, ISAAC, an English painter, was born in 1556. He studied under Hilliard and Frederick Zucchero. His chief employment was in painting miniatures of the most distinguished personages of his time. Among those preserved are—Queen Elizabeth, Mary, Queen of Scots, Prince Henry, son of James I., Ben Jonson, and others, which are admirably finished. He occasionally worked in oil, but with little success. In Kensington Palace there is a fine drawing by I. Oliver of the Entombment of our Saviour, and another from Raphael's Murder of the Innocents. He died in 1617.

OLIVER, PETER, the son of Isaac, was born in 1601, and attained a degree of perfection in miniature portrait painting superior to his father. He likewise painted historical pictures, seven of which are still preserved in Kensington Palace.

OLIVET, JOSEPH THOULIER D', was born at Salins, April 1, 1682, and was brought up by the Jesuits, whose society he quitted about 1714. He died at Paris in 1768. His principal work is an edition of Cicero, Paris, 1740-42, in 9 vols. 4to.; of which there is a very incorrect Oxford reprint. The edition is of no critical value.

OLIVIE'R, GUILLAUME ANTOINE, born near Frejus in 1756, studied medicine at Montpellier, where he took his doctor's degree at the age of 17. He afterwards applied himself to the study of natural history, and at the time of the French Revolution, was despatched by Roland, the Girondin minister, with two other naturalists on a mission to Persia. The fall of the Girondins left them without funds, but they contrived to accomplish their journey, although without effecting anything towards its commercial and political objects. After his return to France, Olivier pre-

pared a narrative of his travels, which were published in 3 vols. 4to., with an atlas, Paris, 1807; also the 'Histoire Naturelle des Coléoptères,' 6 vols. 4to., Paris, 1808; and 'Dictionnaire de l'Histoire Naturelle des Insectes,' in which he was assisted by others, in 9 vols. 4to. He died at Lyon in 1814.

OLLMUTZ. [MORAVIA.]

OLMEDO. [VALLADOLID.]

OLNEY. [BUCKINGHAMSHIRE.]

OLONETZ is an extensive government of Great Russia, comprised between 60° 30′ and 66° 30′ N. lat., 29° 40′ and 40° 20′ E. long. According to Schubert the area is 79,520 square miles, including the great lake Ladoga. It is bounded on the N. and N.E. by Archangel, on the S.E. by Wologda, on the S. by Novogorod, on the S.W. by Petersburg, and on the W. by Lake Ladoga and Finnland.

As this government extends to the polar circle, its northern half has entirely the character of the high northern latitudes, while the southern part has more of the character of the temperate zone. The surface may be said to be equally divided between mountains and forest, open tracts, morasses, and water. There are 1998 lakes, and 858 rivers and rivulets. The two greatest lakes are those of Ladoga and Onega: they both contain numerous islands, most of which are covered with forests. Among the largest of the other lakes are Sego, Wiga, Kemscha, Leckta, Wodlo, Latscha, Kounta, and Nuk. The principal rivers are the Svir, the Olonka, the Ruskola, and the Janez.

The country is for the most part too cold to be very productive. Timber, flax, and hemp are the chief products. The fur-bearing animals furnish a profitable article of commerce. The breeding of cattle is not carried on to any extent. The wild animals are bears, wolves, elks, gluttons, many grayish-red and a few black foxes, a great number of badgers, and wild rein-deer. Seals are found in the two great lakes. Waterfowl of various kinds abound. The fisheries are very productive. The minerals are granite, serpentine, porphyry of various colours, sandstone, quartz, lime, clay, slate, alabaster, talc in large tables, plaster of Paris, and marble. The manufactures and trade are very scanty.

The great majority of the inhabitants are Russians: in the western part there are many Finns. There are a few nomade Laplanders in the circle of Kem. The population amounts to 263,100.

Olonetz, the former capital, is situated in 61° 0′ 45″ N. lat. and 32° 50′ E. long, on the river *Olonka*. It is an open town, with 2800 inhabitants. There are three stone and five wooden churches. Ship-building is carried on. *Petrozavodsk*, the present capital, is situated in 61° 47′ N. lat. and 34° 24′ E. long., on a bay of Lake Onega. It is an ill-built town, remarkable only for the great imperial cannon foundry.

OLORON. [PYRENE'ES, BASSES.]

OLOT. [CATALUÑA.]

OLYMPIAD. [ÆRA; CHRONOLOGY.]

OLYMPIAN GAMES, the chief of the four great national festivals of the Greeks, were celebrated at Olympia, a sacred spot on the banks of the Alpheus, near Elis, every fifth year. The exact interval at which it recurred was one of forty-nine and fifty lunar months alternately; so that it fell sometimes in the month of Apollonius (July), sometimes in the month of Parthenius (August). The period between two celebrations was called an Olympiad. The festival lasted five days. The origin of it is unknown. There was a tradition that the festival was revived by Iphitus, king of the Eleans. The date of the revival of the festival by Iphitus is, according to Eratosthenes, 884 B.C.; according to Callimachus, 828 B.C. Mr. Clinton prefers the latter date. ('Fasti Hellenici,' vol. ii., p. 408, note h.) The Olympiads began to be reckoned from the year 776 B.C., in which Coroebus was victor in the foot-race. We have lists of the victors from that year, which always include the victors in the foot-race, and in later times those in the other games. (Pausanias, v. 8. 3.)

This, like all the other public festivals, might be attended by all who were of the Hellenic race, though at first probably the northern Greeks and perhaps the Achæans of Peloponnesus were not admitted. Spectators came to Olympia not only from Greece itself, but also from the Grecian colonies in Europe, Asia, and Africa. Among them were solemn deputations sent to represent their respective states. The Olympian festival consisted of religious ceremonies, athletic contests, and races. The presiding deity was Jupiter Olympius, whose temple at Olympia contained the chryselephantine statue of the god by Phidias. During the celebration of the festival the territory of Elis was inviolable, and the invasion of it was sacrilege. This festival formed a kind of bond of union among the Grecian states, which were so much distracted by contending interests and rivalities. The effect of this institution on Grecian civilization can only be adequately appreciated by a study of the History of Greece.

OLYMPUS. [ANATOLIA; THESSALY.]

OLYNTHUS, a town in Macedonia, at the head of the Toronaic Gulf, sixty stadia from Potidæa. It fell under the dominion of Athens, but revolted at the beginning of the Peloponnesian war, and secured its independence with the aid of the Spartan Brasidas. From this time it was the most important of the towns of Chalcidice, and the head of a league. The jealousy of the Spartans subsequently made them attack the freedom of Olynthus, which became a dependency of Sparta, B.C. 379. After the Spartan supremacy had been overthrown by Epaminondas, the Olynthians again recovered their independence. Philip of Macedonia viewed with jealousy the confederacy of the Olynthians, but he made peace with them after his quarrel with the Athenians. In B.C. 349 the Olynthians broke off their alliance with Philip, and sent to Athens for assistance. The Athenians, by the advice of Demosthenes, who advocated the cause of the Olynthians in his three Olynthiac Orations, sent troops to their aid; but the Olynthians were defeated, and obliged to surrender their town, which was destroyed by Philip, B.C. 347.

OMAN. [ARABIA.]

OMAR I. (*Abú Hafsah Ibn-al-Khattáb*), successor of Abú Bekr, and second khalif of the Mussulmans, was the third cousin of Abdollah, the father of the prophet. The sworn enemy at first of Mohammed, whose life he attempted, and whose doctrines he opposed, he was at length converted to Islám, and became one of his most zealous and useful adherents. The first act of his administration was to remove from the command of the Syrian armies the celebrated Kháled Ibn Walíd, surnamed 'The Sword of God,' who by his rapacity and cruelty had made himself much disliked. Under Abú Obeydah Ibn-al-Jerráh, who succeeded him, the conquest of Syria was prosecuted, and Damascus, its capital, taken in 635. In 637 Omar sent Amru Ibn-al-Ass and Sarjil to besiege Jerusalem. The city was stoutly defended by the garrison. At length, after a siege of several months, Omar himself performed a journey to Palestine, and after a short conference with the patriarch Sophronius, terms of capitulation were agreed upon. The taking of Jerusalem was followed by the reduction of all the principal cities of Palestine, while Kháled and Abú Obeydah made themselves masters of Laodicea, Antiochia, Aleppo, and Balbek.

Omar next prepared to invade Persia. Saad Ibn Abí Wakkáss, who now commanded the army, defeated at Kádesiyyah a powerful army commanded by Rustam, who fell in the battle, took possession of Bahr-Shír, in the western quarter of the city of Madáyin, the ancient Ctesiphon, founded the city of Kúfah near the Euphrates (638), crossed the Tigris, and at last took Madáyin, the capital of the kingdom. In the meanwhile Amru Ibn-al-Ass completed the conquest of Egypt by the reduction of Alexandria (640). It was then that the famous library founded by Ptolemæus Philadelphus is said to have been destroyed by the conquerors.

The conquest of Egypt was followed by that of part of Africa. Amru pushed his victorious arms as far as the deserts of Tripoli and Barca. Armenia also was subdued by Mugheyrah (641), and Khorassán (642) by Ahnaf Ibn Kays, another of Omar's lieutenants. In the same year was fought the famous battle of Nehavend, which decided the fate of Persia.

The success which attended the arms of Omar, his severity towards the vanquished, and the inexorable justice which he dealt among his own people, excited against him numerous enemies, and several unsuccessful attempts were made upon his life, but at length he was assassinated by a Persian slave, in Nov. 644.

OMAR II. (*Abú Hafs*), the eighth khalif of the family of Umeyyah who reigned in the East, was the son of Abd-al-Aziz, and the nephew of Abd-al-Melek. He succeeded his cousin Suleymán in 717. This khalif, who on his mother's side was great-grandson of the first Omar, imitated in every respect the conduct and the virtues of his illustrious ancestor. Various acts of justice towards the proscribed race of Ali raised alarm among the members and partisans of the family of Umeyyah, and especially Yezíd, his cousin and successor. They accordingly administered to him a slow poison, from the effect of which he died (Jan., A.D. 720), after a reign of 2 years and 5 months.

OMEN, a sign or prognostication of future events, supposed to be an intimation from a superior power. In all probability there is no nation that has not at some time entertained a belief in omens. Many curious instances of Roman superstition with reference to omens are enumerated in Pliny (xxxviii. 2). Pausanias (iv. 13) enumerates the omens which announced the fate of the Messenians in their struggle with the Lacedæmonians. Suetonius ('Jul. Cæs.' s. 59) says that Cæsar, in landing at Adrumetum in Africa with his army, happened to fall on his face, which was reckoned a bad omen; but, with great presence of mind, he laid hold of the ground with his right hand, and kissing it as if he had fallen on purpose, he exclaimed, 'Teneo te, Africa' (I take possession of thee, O Africa). A superstitious regard to omens in our own country formerly made a considerable addition to the stock of human misery. In some parts of the kingdom a belief in omens still exists.

OMENTUM is a broad band of membrane connecting two or more of the abdominal viscera. The chief of these membranes is the great omentum, or caul, which forms a large fold connecting the stomach with the transverse arch of the colon. Others of less size and importance connect the stomach and liver, and the stomach and spleen.

OMER, St., a fortified town in the French department of Pas-de-Calais, 26½ miles by railway S.E. from Calais, stands in 50° 45′ N. lat., 2° 15′ E. long., and has 23,661 inhabitants, including the suburbs. St. Omer is surrounded by fortifications between two and three miles in circuit, constructed of red bricks. It is strengthened by four forts and by entrenchments, and further protected by marshes, which can easily be flooded. There are four gates, of which only two will admit carriages. The town is traversed by the Aa, and by the canal which unites the Aa to the Lys. The principal streets are broad; the houses are chiefly built of yellow or gray bricks, except some of the public buildings, which are of red bricks. The Place d'Armes at the west of the town is the only large square; the town-hall occupies the east side of it. The former cathedral of Notre-Dame, and the church of the former Jesuit college, are the finest of the public buildings. Other remarkable objects are—the ruins of the church of St.-Bertin formerly the finest gothic church in French Flanders; the hospitals; the theatre; and the public library, which contains 20,000 volumes. The town has tribunals of first instance and of commerce, a consultative chamber of manufactures, a college, an ecclesiastical seminary, and an English college for the education of British Roman Catholics. The ramparts, which are planted with elm trees, the quays on the banks of the canal, and the Calais road form handsome public walks. There are many fountains. Woollen cloth, blankets, thread, oil, glue, fishing-nets, paper, brandy, beer, leather, and salt are the leading manufactures of

1749
ASIATIC SOCIETY

the town, which is also the centre of a considerable commerce in wool, corn, wine, flax, coal, &c. The inhabitants of the two suburbs Haut-Pont and Lizel to the north of the town retain the Flemish language, and are mostly engaged in raising garden stuffs on spots of ground which they have recovered by draining from the marshes near the Aa.

OMNIBUS. [COACH.]

OMNIUM, a term used on the Stock Exchange, to express the value, taken as an average, of the different stocks in which a loan is usually funded. Thus, a loan having been contracted for on a certain day, an average is made of the stocks in which such loan is contracted, at the price which they bore on that day, and the fund thus formed as an average of the whole is called Omnium.

OMSK. [SIBERIA.]

ONAGRA'CEÆ. Under this name is comprehended a group of polypetalous exogenous plants, which, in their more complete condition, are certainly known by their inferior ovary, and by all the parts of the flower being four, or a constant multiple of that number. The species are chiefly herbaceous plants, inhabiting the more temperate parts of the world, and have white, yellow, or red flowers; such, for example, as the great genus of *Œnotheras*, or Evening Primroses, and the *Epilobiums*, which are so common as wild plants. It is only in the *Fuchsia*, which has a succulent fruit, and forms an approach to *Myrtaceæ*, that a woody structure is met with.

ONA'TAS of Ægina, the son of Micon, was a painter and a sculptor: he was contemporary with Polygnótus, and lived accordingly in the early part and about the middle of the 5th century before the Christian æra. Pausanias speaks of a group of Homeric heroes near the great temple at Olympia. Inside the shield of one of the statues—that of Idomeneus—was the following inscription:—'As well as many others, this is the work of the skilful Onatas; Micon was his father, his birth-place Ægina.' It is doubtful whether this applied to the whole group, or to Idomeneus alone.

The Thasians also dedicated a bronze statue of Hercules by Onatas at Olympia. Pausanias mentions also, at Olympia, a Mercury carrying a ram under his arm; and several other works in bronze at other places. Onatas is mentioned only once as a painter. He painted the first expedition of the Argives against Thebes on the walls of the vestibule of the temple of Minerva Areia at Plataeæ. Böttiger supposes Micon, the father of Onatas, to be the celebrated Athenian painter of that name.

ONCI'DIUM is a very large genus of tropical and subtropical *Orchidaceæ*, found in the western hemisphere, where the species are common, especially in Mexico and some of the West India Islands, Brazil, and Peru. They have usually yellow flowers spotted with a rich reddish-brown: sometimes the blossoms are purple, and more rarely white. The most remarkable species is the Butterfly Plant (*Oncidium Papilio*), so called in consequence of the supposed resemblance of its flowers to some insect upon the wing. This is found in Trinidad, growing on the branches of trees. It is now common in hothouses.

ONEGA. [ARCHANGEL.]

ONEGLIA. [NICE.]

ONEIDA, Lake. [NEW YORK.]

ONION. The species from which the varieties of the common onion have been derived is the *Allium cepa*. [ALLIUM.] Its leaves and roots are of an annual nature, since they die in the course of a single summer, after perfecting a bulb; the latter however is biennial, and capable of putting forth fresh roots and leaves in the following season, and of acquiring an increase in its size. This property is taken advantage of in one of the modes of cultivation.

Onions will succeed in any good rich soil, provided it be neither too wet and adhesive, nor, on the other hand, too dry and light. They may even be grown successively on the same spot for a number of years, contrary to what happens with the majority of crops. Abundance of well-prepared manure should be thoroughly incorporated in digging the soil. The dung of pigeons and poultry is used with advantage; but some, particularly the French gardeners, prefer sheep-dung.

The time of sowing the general crop is from the middle of February to the middle of March, according to the state of the ground and the weather.

Onions intended for pickling should be sown thickly on poor and dry soil. The silver-skinned, yellow, and two-bladed onions are the best varieties for this purpose.

For a supply of young onions in spring, the sowing should be made in August. Onions are sometimes attacked by a grub at the root. Trenching the soil to a good depth, soot, charcoal-dust, and lime-water have severally been successfully applied as remedies.

ONKELOS. [TARGUMS.]

ONOBRY'CHIS, a genus of plants belonging to the natural order *Leguminosæ*. The species of this genus are natives of Europe or Asia. The most common as well as only British species is *Onobrychis sativa*, common Sainfoin. About forty other species have been described, but none of them possess useful properties.

ONOMATOPE'IA (*ὀνοματοποιΐα, ὀνοματοποίησις*), which literally means 'the making of words,' is the name given to those words which are formed, or supposed to be formed, by an imitation of natural sounds. Thus, the words 'to neigh,' 'to murmur,' 'to bleat,' 'to creak,' and many others, are supposed to be merely imitations of natural sounds; but the number of such words has been greatly exaggerated by some grammarians.

O'NONIS, a genus of plants belonging to the natural order *Leguminosæ*. *O. arvensis*, Trailing Rest-Harrow, is a common British species, usually without spines. *O. reclinata* is found in sandy places in the south of Scotland, the Channel Isles, and the south of France by the sea coast.

There are 107 species of this genus described, but none of them are used in medicine or the arts. They are chiefly natives of Europe; about twelve species are found in Africa, and a few on the coast of Asia. They are generally handsome when in flower.

ONOPORDUM, a genus of plants belonging to the natural order *Compositæ*. *O. Acanthium*, Cotton-Thistle, is found on waste ground in Great Britain and Spain. Another name for the same species is Wild Artichoke, on account of the fleshy receptacle having been once cultivated as an esculent vegetable.

ONOSMA, a genus of plants belonging to the natural order *Borragineæ*. *O. Emodi* is a native of Nepaul. The root is branched, of a dark purple colour, and is used in dyeing.

All the species of this genus, which exceed thirty in number, are extremely handsome when in blossom, but are not valuable on account of any peculiar properties.

ONTARIO, LAKE. [CANADA.]

ONYX. [AGATE.]

OODIPOOR. [RAJPOOTANA.]

OOLITE, the characteristic rock of one of the great systems of secondary strata. The fine yellow freestone of Kettering, the Bath freestone, and the Portland stone are good examples of oolite. The resemblance of the grains to small ova, or the roe of fishes, has given origin to the English term 'Oolite' (from the Greek ὠὸν, όον, an egg).

OOLITIC SYSTEM. [GEOLOGY.]

OONALASHKA. [ALEUTIAN ISLANDS.]

OORT, ADAM VAN, son of Lambert Van Oort, was born at Antwerp in 1557. He soon rose into esteem as a painter of history and landscapes. Van Oort's greatest honour however is, that he was the first instructor of Rubens, who used to say, that if his master had studied at Rome, he would have surpassed all his contemporaries. Adam van Oort died in 1641.

OOSTERHOUT. [BRABANT.]

OPACITY is a condition of bodies by which they are incapable of transmitting light through them. According to Newton, it may arise from the unequal densities of the particles of certain substances, in consequence of which the rays of light on entering those substances suffer such refractions and reflexions as cause them to be finally absorbed. The advocates of the undulatory theory ascribe opacity to the unfitness of the pores, or intervals between the particles of a body, for permitting the vibrations of the particles of æther, and consequently for continuing in the interior the existence of the waves which are incident on its surface.

OPAL. Of this mineral, which is essentially a hydrate of silica, there are nearly a dozen varieties, named *Precious Opal, Fire Opal, Hydrophane, Common Opal, Semi-Opal, Wood Opal, Cacholong, Opal Jasper, Menilite, Hyalite* or *Muller's Glass*, and *Geyserite*. The varieties differ greatly in colour and transparency. The *Precious Opal* exhibits a beautiful play of colours.

OPERA, a regular drama set to music, always accompanied by scenic representation, frequently by machinery, and sometimes by dancing. The true Italian Opera is all recitation or air, &c.; but what is called Opera in the national theatres of Germany and England, as well as the French *Opéra Comique*, is of a mixed kind—partly spoken, partly sung.

The constituents of an opera, says Rousseau, are, the Poetry, the Music, and the Decorations. But the poetry of an opera has long ceased to be considered otherwise than as a vehicle for the music, and, but for the scenery and decorations, the saying of the Abbé Arnaud, that 'the Italian opera is a concert, of which the drama is the pretext,' would be applicable to nine in ten of all productions of the kind that have appeared during the last seventy or eighty years.

That the opera, whether Italian or French, is the offspring of the Greek drama, is an opinion supported by the most learned and able writers on the subject. Dr. Brown ('Dissertation on the Rise, &c., of Poetry and Music'), after showing to us, in a very satisfactory manner, that the Greek drama was musical, proceeds to state, that 'the same union was borrowed and maintained through the several periods of the Roman Empire. If therefore we suppose, what is altogether probable, that the form of the ancient tragedy had been kept up in some retired part of Italy which the barbarians never conquered, we then obtain a fair account of the rise of the modern Opera, which hath so much confounded all inquiry.'

Some writers imagine that the modern musical drama originated in Italy, towards the latter part of the 15th century. Menestrier believed, on the authority of Sulpitius, that the first opera was performed at Rome about the year 1480. But after collating what has been stated by various authors, we are persuaded that no regular opera was produced and publicly performed till Ottavio Rinuccini wrote and Jacopo Peri composed the drama of 'Euridice' for the nuptials of Henri IV. of France and Mary of Medicis. This was represented in a very splendid manner at Florence, in 1600, and there published in the same year. The Bolognese dispute with the Florentines the honour of having first produced a musical drama, but it appears that the 'Euridice' was performed in their city the year after it had been produced at Florence. The opera was introduced at Venice in 1637, at Naples in 1646, and at Rome in 1671.

The Italian Opera made its way to London by slow and cautious steps. Public opinion, except among the higher circles, where novelty is everything, did not favour it at first; and it was attacked by a host of critics and wits. In July, 1703, Italian intermezzi, or 'interludes and musical entertainments of singing and dancing,' were performed at York Buildings. Two years after, 'Arsinöe,' translated from the Italian, the dialogue and narrative parts in recitative, and the singers all English, was produced at Drury Lane. In 1706, 'Camilla,' also a translation, was performed by the same persons in a similar manner. At length, in 1710, 'Almahide,' written wholly in Italian, and performed exclusively by foreign singers, was presented to the public at the Queen's Theatre in the Haymarket. Thus the Italian Opera gained a settlement in this country; it soon became firmly fixed, and now seems to be as necessary, as a source of amusement to the metropolis of this kingdom, as any other favourite and long-established entertainment.

The Italian Opera was brought into France in

1646 by the Cardinal Mazarin, and continued for some years to be performed at the Louvre; but the establishment of the *Académie Royale de Musique*, in 1670, superseded it, until again introduced early in the present century.

The grand French Opera is wholly musical, and was founded by Louis XIV. In 1669 that king granted letters-patent to the Sieur Perrin for the establishment of an 'Académie des Opera en Langue Française,' who, taking as his partner the Sieur Cambert as composer, commenced his undertaking at the Théâtre de l'Hôtel de Guenégaud, in 1671. The Opéra Comique had its birth in France in 1750, in imitation of the Italian Opera Buffa. This however is of the mixed kind, the dialogue being spoken.

The genuine Italian Opera has long flourished in Germany. For the different German courts some of the finest operas have been composed.

What is called English Opera is, with two or three exceptions, of the mixed kind. The first that we have any account of that can be relied on is Shadwell's 'Psyche,' composed by Matthew Lock, and brought out in 1673. Two years after, Dryden wrote his 'Albion and Albanius,' an opera, set by a Frenchman, Louis Grabut; but when that great poet wrote his 'King Arthur,' he was fain to apply to Purcell for assistance. Addison's 'Rosamond' was, it is to be supposed, a real opera, the dialogue in recitative. This was represented in 1707, but failed, as Hawkins tells us, owing to the poverty of the music by one Clayton. 'The Beggar's Opera' is so well known that it need only be named. 'Artaxerxes,' by Dr. Arne, is the only opera, strictly so called, that keeps its place on the stage; but Arne composed many other musical pieces. His 'Love in a Village' will never be superannuated; and in truth, if the dramatic music of some of our countrymen who charmed the public ear during the latter half of the last century could be heard without prejudice, it would be admitted that in original expressive melody the English are inferior to no nation in Europe.

OPE'RCULUM. In Botany this term is chiefly used for the cap which forms the upper extremity of the theca, or sporangium, of a moss, covering over the peristome, and usually falling off when the spores are ready for dispersion. It has also been applied to the lid which covers in the Pitcher of *Nepenthes*, where it is the lobe of a modified leaf.

OPERCULUM (Malacology), the plates or pieces which protect the apertures or exposed parts of certain molluska. In many of the testaceous gastropods it becomes a cover or door, which fits the aperture of the shell more or less accurately when the animal has retired within it. *Opercula* of this kind vary much in structure and shape. Thus they are sometimes horny, as in *Trochus* and *Murex;* sometimes shelly, nay, almost stony, as in *Turbo;* and in construction they are for the most part either spiral, concentric, or unguiculated.

OPHICLEIDE, a musical instrument made of brass or copper, and intended to supersede the Serpent—of which it is a decided improvement—in the orchestra and in military bands. It is a conical tube, the longest nearly nine feet in length, terminating in a bell, like the horn. It has ten ventages, or holes, all of which are stopped by keys, similar to those of the bassoon, only of larger dimensions, and is furnished with the same kind of mouth-piece as the Serpent. The scale of the base Ophicleide is from B, the third space below the base staff, to c, the fifth added space above it, including every tone and semitone within this compass of three octaves and one note. The volume of sound it emits is immense, but the tone is rich and round, and blends well with the voices in choruses.

OPHI'DIUM (from ὄφις, a snake), a genus of malacopterygious fishes of the Eel tribe. The species have smooth heads, and long slender bodies, margined by the united dorsal, anal, and caudal fins. The jaws, palate, and pharynx, are all furnished with teeth. The branchial aperture is large. The species vary in form and colour, and in the presence, absence, and number of filamentous appendages or beards attached to the under jaw. Two species inhabit the British seas, but are both very rare. In the Mediterranean the bearded Ophidium is common, and is used for food.

OPHIOCE'PHALUS (from ὄφις, a snake, and κεφαλή, head), a genus of fishes belonging to the division of *Acanthopterygii*, characterised by having labyrinthiform pharyngeals, and capable of living for a long time out of the water. The species inhabit India and China. [ANABAS.]

OPHIOGLOSSACEÆ. [FILICES.]

OPHIOGLOSSUM, a genus of plants belonging to the natural order *Filices* and the tribe *Ophioglosseæ*. *O. vulgatum*, Adder's Tongue, is the only British species. This plant is generally distributed over England, and in many places is exceedingly common, covering large plots of ground, and is highly injurious to the crop of grass. It is less frequent in Wales, Scotland, and Ireland. It is a common plant on the continent of Europe, and is said to occur in Africa and North America. Like most singular-looking plants, it has been used in medicine.

OPHIOMORUS, a genus of Scincoidean Lizards (subfamily *Saurophthalmes*), established by MM. Duméril and Bibron. This genus is closely allied to the genus *Anguis* of Linnæus (Blind-Worm, *Orvet Commun* of the French), but differs in dentition and some other particulars. One species only is known, viz. *O. miliaris*, a native of the Morea, Algeria, and, according to Pallas, of Southern Russia.

OPHIOPHTHALMES, the name assigned by MM. Duméril and Bibron to their second subfamily of *Scincoidean Lizards*, having all naked eyes, but only one of them (*Gymnophthalmus quadrilineatus*) being completely without the eyelid. In the others there exists a rudiment surrounding the orbit either entirely or in part, under the form of a ring or demi-ring, often very narrow and immovable, sometimes rather enlarged at the upper part, and susceptible of being folded back under the orbital border, or of advancing a little upon the eye-ball, as in some

species of *Ablepharus*. The genera placed by the authors above quoted under the *Ophiophthalminæ* are few, and the species not numerous. The genera are *Ablepharus*, *Gymnopthalmus*, *Lerista*, *Hysteropus*, and *Lialis*.

OPHIO'XYLON, a genus of plants belonging to the natural order *Apocynaceæ*. *O. serpentinum*, Serpentine Snake-Wood, is a native of the East Indies. In rich soil it becomes a climbing plant, but in poor soil it is a small erect shrub. In India the root of this plant is employed as a remedy in many diseases. It is given inwardly as a febrifuge and after the bite of poisonous animals. This plant is of easy culture and beautiful appearance.

OPHIR, a place which was known to the Hebrews and to the neighbouring nations, as early as the time of Job, as producing such an abundance of excellent gold, that 'the gold of Ophir' became a proverbial expression for fine gold. (1 Chron. xxix. 4; Job xxii. 24; xxviii. 16; Psalm xlv. 9; Isaiah xiii. 12.)

The position of this place is difficult to determine. The most probable opinion is, that Ophir was in the south of Arabia. It is mentioned in connection with the names of Arabian tribes in Gen. x. 29. The 'gold of Ophir' is mentioned in the book of Job, which is most probably of Arabian origin. The products of the voyage might easily have been obtained from Arabia, for though gold is not found there now, we have the testimony of several ancient writers that it was in ancient times. It is however very probable that Ophir was an emporium of the Phœnicians for their eastern trade; if so, the difficulty as to the productions is removed. This opinion is held by Michaelis, Gosselin, Vincent, Rosenmüller, and most modern historians.

OPHISAURUS, Daudin's name for a genus of reptiles (*Hyalinus* of Merrem) nearly allied to the Scheltopusiks (*Pseudopus*, Merrem), and, according to Cuvier, one of the subgenera of the *Anguidæ*. [BLIND-WORM.] The genus is placed by MM. Duméril and Bibron among the *Ptychopleures*, the first subfamily of their *Chalcidian Lizards*. Example.—The Glass-Snake (*Ophisaurus ventralis*; *Anguis ventralis*, Linn.; *Cœcilia maculata*, Catesby. Locality, the Southern United States of America.

OPHIU'CHUS (the Serpent-Bearer), one of the old constellations, representing a man holding a serpent, which is twined about him. But the moderns make a separate constellation of the serpent. [SERPENS.] Ophiuchus has also been called Anguitenens and Serpentarius. The figure of the man rests his feet upon the back of Scorpius, and is surrounded by Scorpius, Libra, Bootes, Corona, Hercules, and Aquila. It is not a constellation of any note, containing no star of the first, and one only of the second magnitude. The small number and insignificance of the mythological traditions connected with it are rendered less surprising by this paucity of remarkable stars, since the latter is a presumption that the constellation itself is of a later date than Orion or Ursa Major.

OPHIU'RA, Lamarck's name for a genus of Star-Fishes. M. de Blainville makes it the first genus (*Euryale* being the other) of his *Asterophydea*, or more correctly, *Asterophidia*, the second family of his *Stelleridea* (*Asterias*, Linn). In this group the body is small, disciform, very much flattened, the circumference furnished with appendages more or less elongated, serpentiform, squamous, and without inferior furrows.

The organization of this family differs in many points from that of the true *Asteriæ*; and there is also a difference in their habits.

Geographical Distribution.—Very general; hardly any seas are without species of this group; and there are many in those of Europe, though M. de Blainville thinks that zoologists have exaggerated the number.

Habits.—The Ophiuræ swim and creep often with much facility in all directions, agitating the appendages of the arms in a serpent-like manner.

OPHRYS, a genus of plants belonging to the natural order *Orchideæ*. *O. apifera*, Bee Orchis, one of the handsomest species of orchidaceous plants, is a native of Great Britain, and grows on chalky calcareous soils. *O. arachnites*, late Spider Orchis, is found on chalk downs near Folkstone and Sittingbourne in Kent. *O. aranifera*, Spider Orchis, has the lip of a dark brown colour, hairy, and covered with pale or yellowish lines. It is found in chalky places in Kent and Sussex. *O. muscifera*, Fly Orchis, is a slender plant, and grows about a foot high. It is found in damp calcareous thickets and pastures in Great Britain.

OPHTHA'LMIA (from *ophthalmos*, ὀφθαλμὸς, the 'eye') is an inflammation of the eye. General ophthalmia, or an inflammation of the whole globe of the eye, is a very rare occurrence. Cases however do occur, from severe injuries or other causes, in which the signs of all the special forms of ophthalmia are combined, and they are the most formidable affections to which the eye is liable. Unless met by the most active antiphlogistic treatment, they usually terminate in complete destruction of the organ.

In the large majority of inflammations of the eye, one part of it is alone or especially affected. Hence there have been described numerous varieties of ophthalmia, a distinct name being formed for the inflammation of each part or tissue by appending the termination *itis* to its anatomical name; as conjunctivitis, iritis, and corneitis, for the inflammations of the conjunctiva, iris, and cornea. [EYE.]

Of all the varieties of ophthalmia, slight inflammation of the conjunctiva is the most frequent. It is the common result of all slightly-irritating bodies being introduced between the eyelids, and of the application of cold, in which case it is often called catarrhal ophthalmia. Its symptoms are redness of the external membrane of the eye and of the lining of the eyelids, and an increased secretion of opaque white or yellow tenacious mucus, which agglutinates the eyelids. The pain is seldom acute. No active means are required. In mild cases, a lotion composed of two grains of sulphate of zinc to the ounce of water is the best remedy.

OPIE, JOHN, the son of a carpenter, was born in 1761, at St. Agnes near Truro, in Cornwall.

His astonishing talent for art, developed at a very early age, attracted the notice of Dr. John Wolcot (Peter Pindar), who took Opie into his house in the double capacity of his protégé and servant. Opie afterwards came to the metropolis under the doctor's immediate care and protection. In the meantime he had pursued his art successfully as an itinerant portrait-painter. In London, Wolcot managed matters so well that within a short time his Cornish lad became the rage among the fashionable world; and although this was not of very long duration, the tide of patronage left him in comfortable circumstances. In 1798 he married his second wife, Amelia, the daughter of Dr. Alderson, a physician at Norwich. In this lady, who subsequently became one of the most popular novelists of the day, he found an intellectual companion and judicious adviser.

Opie now divided his attention between portrait-painting and historical painting, in which latter his best productions are—'The Murder of James I. of Scotland;' the 'Death of David Rizzio;' 'Arthur taken Prisoner;' 'Hubert and Arthur;' 'Belisarius;' 'Juliet in the Garden,' &c. None of these works affect ideal beauty or refined poetical conception, but they are stamped by a peculiar energy of style, and by a vivid reality. He afterwards obtained the professorship of painting at the Royal Academy. He delivered only four lectures (afterwards published by his widow), in February and March, 1807. He died April 9, 1807, and was buried in St. Paul's Cathedral, near Sir Joshua Reynolds.

OPITZ, MARTIN, the father of modern German poetry, was born at Bunzlau in Silesia, in 1597. He studied at Beuthen, Frankfort, and Heidelberg; and at Beuthen he composed his dissertation entitled 'Aristarchus, sive de Contemptu Linguæ Teutonicæ,' 1618, in which he vindicates the merits of his native tongue. He devoted himself to his pen, but appears to have lived in several different places. It was at Holstein that he composed his 'Trostgedicht,' or poem on Consolation in the Disasters of War, which however he did not publish until nearly 13 years afterwards (1633), when war was raging in Germany. In 1622 he was invited to become teacher of philosophy and humanities at the school of Weissenburg in Transylvania, where he commenced his 'Dacia Antiqua,' an historical work which occupied him many years, but which was left incomplete, and the MS. lost after his death. He returned to Liegnitz in 1623, and in the following year appeared the first edition of his poems. At Vienna, he was noticed by Ferdinand II., who bestowed a laurel crown upon him for his poem on the death of the archduke. In 1626 he accepted the post of private secretary to Count von Dohna, on whose death in 1633 he settled for a time at Danzig, where, having recommended himself to Uladislaus IV. of Poland, by a poem on his campaign against Russia, he was appointed Polish historiographer. While his reputation was thus daily increasing, a plague broke out in Danzig, to which he fell a victim, Aug. 20, 1639.

OPIUM. [PAPAVER.]

OPOPANAX, a genus of plants belonging to the natural order *Umbelliferæ*. *O. Chironum* is a native of the south of Europe and Asia Minor, on dry hills, margins of fields, and thickets. It is a plant six or seven feet high, of a dull yellowish colour, and resembling a parsnip. Although this plant is a native of the south of Europe, the resinous gum which exudes from the stalk or root when wounded is brought from the Levant and East Indies in roundish drops of a reddish yellow colour, with specks of white. Its constituents are resin, gum, and volatile oil. In its action on the human system it corresponds with the other gum-resins of the *Umbelliferæ*.

OPORINIA, a genus of plants belonging to the natural order *Compositæ*. *O. autumnalis* is a native of Great Britain in meadows and pastures and on lofty mountains.

OPORTO (O PORTO, 'the Port'), a large city and seaport in the Portuguese province of Entre-Douro-é-Minho, is situated on the declivity of a hill on the right bank and about 2 miles from the mouth of the Douro, in 41° 11′ N. lat., 8° 37′ W. long., about 160 miles N. from Lisbon, and has about 80,000 inhabitants, including the population of the suburbs of Villanuova, and Gaya, the ancient *Cale*. Seen from the river, the city presents a very striking appearance. The houses, being all white-washed, give it an air of great cleanliness, but, on a closer inspection, many of the streets are found to be narrow, crooked, and dirty, and some of them are very steep. It contains however several broad straight streets, with a number of new and handsome houses, having gardens attached to them filled with vines and orange trees.

The river affords a deep and secure harbour, without any artificial aid except an elevated and walled quay, to which the ships' cables are fastened during the freshes or floods in the Douro. These freshes often cause a sudden rise of 40 feet, and come down with such force, that vessels trusting to their anchorage alone, would inevitably be carried out to sea. The mouth of the Douro is obstructed by a bar, which is seldom practicable for vessels that draw more than 16 feet water. The quay extends the whole length of the town.

Oporto has 11 public squares, of which the most spacious are As-Ortas, San-Roque, and Vitoria; 14 charitable asylums; and 90 churches, besides a fine and spacious cathedral. The immense lodges or wine cellars in the town and neighbourhood are deserving of especial notice. The city gives title to a bishop, who resides chiefly at Mezanfrio, but has a fine palace in Oporto. The theatre, built in the highest part of the town, is much admired.

The principal trade of Oporto is in port wine, which takes its distinctive name from the town. Oil, sumach, lemons, oranges, wool, refined sugar, cream of tartar, salt, leather, cork, &c., are also exported. The imports are—corn, rice, beef; woollen, cotton, iron, and hardware manufactures; salt fish, hemp, and flax; sugar, coffee, deals, &c. There are at Oporto some manufactories of hats, silks, linen stuffs, and pottery, besides ropewalks and dockyards, none of which however are in a thriving condition. The wine and brandy trade

is a monopoly of the Oporto Wine Company. The export of wine is about 33,000 pipes annually; of this quantity 4-fifths go to England. The customs duties of Oporto for the year ending June 30, 1849, amounted to 1,891,347 dollars 634 reis.

The town is surrounded by an old wall flanked with towers. It was taken by the French during the Peninsular war, and in 1833 by Don Pedro, after more than a year's siege, during which the city buildings were greatly injured, and its trade almost annihilated.

OPOSSUM. The true Opossums are confined to the American Continent; yet in a former condition of the earth's surface, it would appear that certain species existed in what we now call the European Continent, including our island. These animals belong to the order MARSUPIALIA.

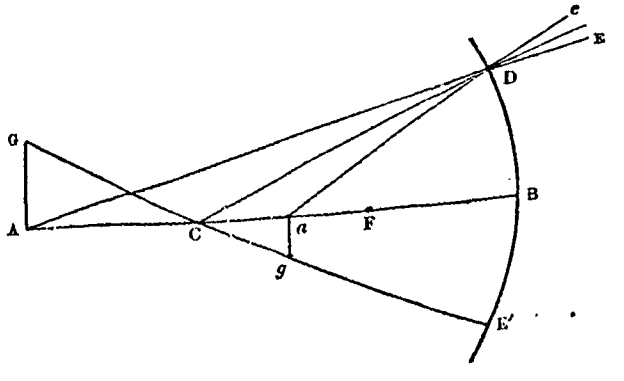
OPPELN one of the four governments of Prussian Silesia, comprises the greater part of Upper Silesia, and almost wholly consists of hills and mountains. It is bounded N. by the government of Breslau, E. by Poland and the republic of Cracow, S. by Galicia, and W. by Austrian Silesia. Its area is 5143 square miles, and the population in 1847 was 987,318, nine-tenths of whom are Catholics. It has extensive forests of fine timber, and abounds in valuable minerals. This part of the province is less fertile and much colder than Lower Silesia. The snow falls early and lies late. The Oder traverses the country in its whole extent.

The administrative capital of the government *Oppeln* is situated on the Oder, 50 miles S.E. from Breslau, by the Breslau-Vienna railroad, and has about 7000 inhabitants who manufacture linen, tape, leather, and earthenware; and trade in timber, zinc, lead, hardware, woollen cloth and Hungarian wines. The town, which is walled and entered by 4 gates, is connected by bridges with an island in the river laid as a park. It possesses several churches, a synagogue, a gymnasium, and a school of midwifery. *Neisse*, at the confluence of the Biela with the Neisse, a feeder of the Oder, is about 50 miles W. by S. from Oppeln, and has a population of 11,000. It is a clean well-built fortified town; but the site is marshy and unhealthy. The episcopal palace, 6 Catholic churches, 1 Protestant church, a synagogue, and town-hall are the principal buildings. This town has a gymnasium, a royal manufactory of arms, a powder mill, several breweries, and manufactures of linen and woollen stuffs, ribands, stockings, and yarn. The other towns are—*Gleiwitz*, S.E. of Oppeln, which has a population of 5400, a gymnasium, and great iron foundries. *Lobschütz*, 30 miles S. from Oppeln, which has a gymnasium, a handicraft school, manufactures of linen, woollen cloth, stockings, and leather; population 5781: and *Ratibor*, a station on the Breslau-Vienna railroad, on the left bank of the Oder, which is a walled town, entered by 4 gates, with a gymnasium, and a population of 6700, who manufacture cloth, linen, earthenware, beer, leather, &c.

OPPIAN, a Greek grammarian and poet of Cilicia, two of whose works are still extant, under the titles of 'Cynegetica' and 'Halieutica.' He lived in the time of the emperor Caracalla, whom he addresses by the name of Antoninus. The 'Cynegetica' is a poem, in hexameter verse, on hunting; and the 'Halieutica,' also a poem in hexameter verse, is on fishing. These works show some knowledge of natural history, mixed with a great many absurdities. The best edition of Oppian is by Schneider, Strassburg, 1776, 8vo.

OPPIDO. [BASILICATA.]

OPTICS is that branch of physical science which explains the formation of images, as depending on the known laws by which the modifications of light are governed. [LIGHT.] These images are formed either by polished reflecting surfaces, or by transparent refracting media. In the former case the angles of incidence and reflection are equal; in the latter the sines of the angles of incidence and refraction are in a constant ratio for one and the same medium. The position and magnitude of the image of an object is easily ascertained, when we have previously ascertained the position of the image of a point, in reference to the position of the point itself and of the reflecting or refracting instrument (as a mirror or lens); in other words, when we have found the relative position of the conjugate *foci*; the word focus being applied to a point from which rays of light diverge, or to which they converge. The principal focus of an instrument is that to or from which a pencil of parallel rays falling perpendicularly (or nearly so) on the instrument, is made to converge or diverge after reflection or refraction. We shall now proceed to the relations existing between the conjugate foci of spherical reflectors, observing that the axis of the instrument is the



right line containing the centre of the spherical surface and the conjugate foci. The rays under consideration are those which are directed nearly along the axis, and which therefore fall nearly perpendicularly on the reflector.

Let DBE′ represent the section of a spherical reflector made by a plane passing through its axis, C its centre, A the focus of incident rays, AD an incident ray, ADC is the angle of incidence; make the angle $aDC = ADC$, then aDC is the angle of reflection, and if the point of incidence D were infinitely near to the point B in the axis, then all the reflected rays of which the incidence was nearly perpendicular would converge to a; the latter would then be the focus conjugate to A; for if rays diverged from a they would after reflexion evidently converge to A.

Now if a straight line as CD bisect an angle of a triangle, as the angle ADa, it will divide the base into segments AC, Ca, proportional to the adjacent sides AD, Da (Euc., book vi.), that is, AC : Ca : : AD : Da, but when D is infinitely near to B we may write AB and Ba instead of AD and Da, in which case we should have AC : Ca :: AB : Ba; whence

$$\frac{1}{AB} + \frac{1}{aB} = \frac{2}{CB}. \quad (A)$$

We should have precisely the same investigation if we had supposed rays as ED to fall on the convex side converging to a focus A; but being reflected in the direction De, they would appear to diverge from the conjugate focus a: hence the above formula applies to two cases, viz. when diverging rays fall on the concave surface, or converging rays on the convex surface, of a spherical reflector.

If the distances of the foci A and a are measured from the centre C, instead of the surface of the speculum, the above formula becomes

$$\frac{1}{Ca} - \frac{1}{CA} = \frac{2}{CB}. \quad (B)$$

When the incident rays proceed from a point exceedingly distant (as the sun, for instance) then, AB being very great, $\frac{1}{AB}$ will be exceedingly small and may be rejected, in which case we have $\frac{1}{AB} = \frac{2}{CB}$ or $AB = \frac{1}{2}CB$, that is, parallel incident rays are made after reflexion to converge to F, the middle point of the radius CB. Hence the focal length of a spherical speculum is one-half that of its radius.

With respect to the images formed by concave specula, let AG represent a small object at A; join GC, then GCE′ will be the axis of the speculum when G is considered the focus of incident rays, and its conjugate focus g can be found by the preceding formula (A) or (B); hence ag will be the image of AG: its position is evidently inverted, and by similar triangles, the linear dimensions of the image ag are to those of the object AG as CG, or as Ca : CA; and the formula (B) gives

$$\frac{Ca}{CA} = \frac{CB}{2AC + CB};$$

hence the image is less than the object; on the contrary, if the object be between the centre and the principal focus, as at ag, AG would become the image, which shows that the image is then magnified.

When diverging rays fall on a convex spherical speculum, or when converging rays fall on a concave speculum, A being then on the convex side of the mirror, while C and a are on the concave side, the formula (B) becomes

$$\frac{1}{CA} + \frac{1}{Ca} = \frac{2}{CB}.$$

If AG be the object, and ag the image, the ratio of the former to the latter is as AC to Ca; on the contrary, if ag be the object and AG the image, the former is to the latter as Ca to AC. Generally the image will be erect or inverted, according as one of the conjugate foci is between the principal focus and surface, or between that point and the centre; for it is easily seen that in every case one of the foci is in some part of the radius between the centre and surface.

In the preceding calculations, we have confined ourselves to such rays as fall nearly perpendicularly on the reflecting surfaces. The rays which are at a considerable distance from the axis of a spherical speculum are not reflected accurately to the same point as those incident near the axis; hence arises a diffusion of the reflected rays arising from the sphericity of the speculum, and denominated the *spherical aberration*; and, when measured along the axis, it is called the *longitudinal aberration*; but, when perpendicular to it, through the focus, the *lateral aberration*. If the angle DCB be represented by θ, the incident rays being parallel to the axis, the former aberration will be expressed by $\frac{1}{2}BC\ (\sec.\theta - 1)$, and the latter by $\frac{1}{2}$ BC tan. 2θ.

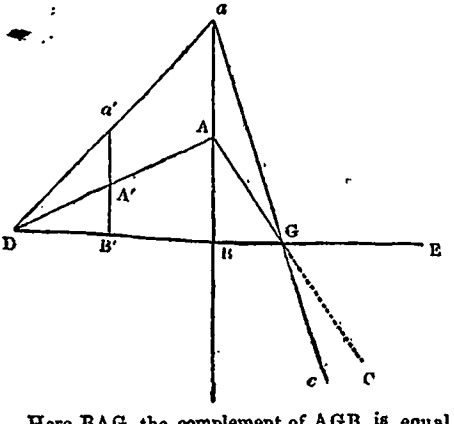
We have hitherto considered only such rays as fall nearly perpendicularly on the reflecting surface; but since rays fall at all incidences from a luminous point, each pencil of rays, at whatever incidence, when in the same plane, after reflection, converges to or diverges from some point (unless reflected parallel); a line of light containing all such points in that plane forms a *caustic* line, and in all possible planes constitutes a caustic surface. Caustics formed by reflexion have been distinguished from those produced by refraction by giving the name of *diacaustics* to the latter and *catucaustics* to the former, in the same manner in which that part of optics connected with refraction has been denominated *dioptrics*, and that with reflexion *catoptrics*.

We now come to the consideration of refracting transparent media; and if we suppose the constant ratio of the sine of incidence to that of refraction to be as m : 1, then m is called the index of refraction for the particular medium employed, the incident light being supposed to pass from vacuum. But if the light pass from the medium into vacuum, then the ratio of the sine of incidence to that of refraction would be as $1 : m$, and $\frac{1}{m}$ would be the refractive index; m is evidently greater than unity, since the ray after

entering the medium is turned towards the perpendicular, and $\frac{1}{m}$ is less than unity, because after the ray emerges from the medium into vacuum, it is turned from the perpendicular. If m be the index of refraction from vacuum into one medium which we may call A, and m' that from vacuum into a different medium B, then $\frac{m'}{m}$ is the index when the light passes from the medium A to B.

Diverging rays fall from vacuum on the *plane* surface of a uniform and transparent medium: it is required to find the relation between the conjugate foci.

Let A be the focus of incident rays, DBE the surface of the medium, AB a perpendicular on DE, AG an incident ray near; this perpendicular, GC (AG produced) the course of the ray if unrefracted, Gc its actual course nearer to the perpendicular than GC, then cG to an eye placed in the medium will appear to proceed from the point a; the conjugate focus; the question is to determine the relative situations of a and A.



Here BAG, the complement of AGB, is equal to the angle of incidence, and BaG to that of refraction: then, by trigonometry

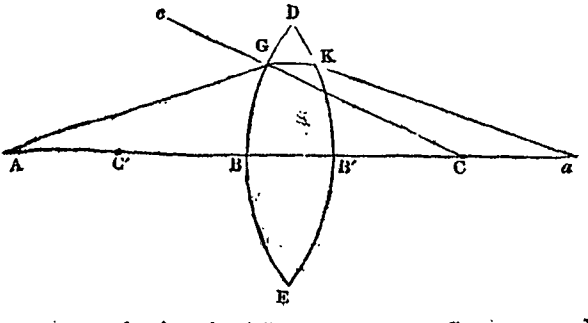
$$\frac{aB}{AB} = \frac{\text{tan. BAG}}{\text{tan. B}a\text{G}} = m\,\frac{\text{cos. B}a\text{G}}{\text{cos. BAG}};$$

which, when the angles are very small, gives $\frac{aB}{AB} = m$. If a ray from a medium bounded by a plane surface pass into vacuum, $\frac{1}{m}$ is then the index of refraction, and we should have $aB = \frac{1}{m}$ AB, in which case aB is less than AB. This explains why the bottom of a clear river seems nearer to the surface than it really is by about one-fourth of its true depth.

The image of a straight line in vacuo seen from such a medium will be another straight line; for let AA', supposed to be very small, be such a line, produce it to D, and join Da, then since $a'B' : A'B' :: aB : AB :: m : 1$; therefore a' is the focus conjugate to A', and consequently aa' is the image of AA'. In the above case the image aa' is more remote from the surface DE than the object; but the contrary happens when the object is in the medium, when the image will be nearer the surface than the object is. Hence many familiar optical phenomena may be understood. Thus, when a shilling is placed in an empty vessel, and the eye is so situated that the sides of the vessel just conceal the shilling, upon pouring into it a small quantity of water the shilling will appear as if raised up, and becomes visible. For a like reason the sun and stars are visible before they actually rise above the horizon or set below it; and when a straight stick is partly immersed in water, the image of the immersed part being raised nearer to the surface than the true object, will cause the stick to appear bent or broken, as well as shorter than it really is; but when immersed perpendicularly to the surface, the stick appears to be only contracted about one-fourth of the part immersed, for the image and object are then in one straight line.

As refracting media bounded by a single curved surface rarely if ever can occur in practice, we shall proceed to consider lenses, particularly the double convex lens, as known most generally. For their various species see LENS.

Let DBEB' represent a plane section of a double convex lens, let A (in the *axis* CC') be the focus of the incident rays, and a of the emergent rays. Let m be the index of refraction for incident, and therefore $\frac{1}{m}$ for emergent rays; and let AGKa represent the track of a ray near the axis.



Then, since, by the law of refraction, sin. AGc $= m$ sin. KGc, it will be found, by trigonometry, also considering G as very near B, that

$$\frac{CB}{AB} - m\frac{CB}{\delta} = m - 1,$$

δ denoting the distance from B at which KG produced cuts BA; hence δ, which determines the focus of the first set of refracted rays, is known. Now, since the ray would traverse the same course if we supposed it to commence at a, and proceed through aKG to A, it follows in the same way that

$$\frac{1}{aB'} + \frac{m}{\delta + t} = \frac{m-1}{C'B'}$$

t being the thickness of the lens: neglecting this, as small, we have

$$\frac{1}{aB} + \frac{1}{AB} = (m-1)\left(\frac{1}{C'B'} + \frac{1}{CB}\right).$$

When we have one side plane, we have only to suppose CB infinite, and thus one general formula, by proper attention to the signs, may be made to apply to all forms of lenses.

OPTICS, PRACTICAL, is that part of science which applies the physical properties of Light and the mathematical laws of Optics to the construction of useful optical instruments. By the former we determine the constants necessary to render the formulæ of the latter convertible into numbers. The refractive and dispersive indices peculiar to transparent media are constants of this nature, and the instruments adapted to the easy vision of near or distant objects, to great or small objects, and to other optical purposes, are described under their proper heads. [Camera Lucida; Eye; Microscope; Telescope; &c.]

The refractive indices of transparent and semi-transparent media have been a subject of research to many experimenters, and were considerably advanced by Newton; but the additional properties of light discovered since his time have enabled philosophers to calculate to a far greater degree of accuracy the indices both of refraction and dispersion than was then practicable.

The theory of achromatism, or the method of correcting the aberrations of the rays of light, has been pursued by Euler, D'Alembert, Herschel (Sir J.), and many others; but the earliest successful construction was made by Mr. Hall in 1733. The same was effected in 1757 by Dollond, whose labours, together with those of his son, gave a great impulse towards the complete accomplishment of an object of which Newton seems almost to have despaired. In the same career of late years we must distinguish Frauenhofer, who obtained at an early age from the French Academy the prize for the actual construction of achromatic glasses. [Frauenhofer.]

The accurate determination of the refractive and dispersive indices has also been pursued with great success in this country, and simultaneously by some of the following distinguished men:—Dr. Thomas Young, Dr. Brewster, Dr. Wollaston, Sir J. Herschel, Professor Faraday, &c.; and in France, by Biot, Dulong, &c.

OPU'NTIA is the name given by botanists to those cactaceous plants which gardeners call

Indian Figs. On one of them, *Opuntia cochenillifera*, the Cochineal Insect is fed, and others yield a pleasant subacid fruit, which is eaten in hot countries.

ORACLE (from the Latin *oraculum*, and that from *os, or-is*, a mouth). Oracle was the Roman name used to denote the place where answers were supposed to be given by any of the divinities to those who consulted them respecting the future. Sometimes also it was used to signify the response which was delivered, and sometimes the deity from whom this response was imagined to proceed. The most famous oracles of antiquity were those of Dodona and Delphi. The oracle of Delphi plays a great part in Grecian mythology and history. It was a central point for all the nations of Greek origin, who came to consult the god Apollo, and left their offerings at his temple. Foreign princes also, as Crœsus, king of Lydia, sent presents to the temple of Delphi, which was enriched by the piety of many successive generations. Being a place of inviolable sanctity, it was also used as a safe depository for gold and silver. After the Roman conquest of Greece the oracle of Delphi fell into comparative neglect, for political circumstances diminished its influence, and the faith of the people was departed. It appears that oracles were occasionally consulted even to the fourth century of the Christian æra; but long before that time they had sunk into insignificance.

ORAN. [Algiers.]

ORANGE. [Citrus.]

ORANGE, *the Principality of*, included the town and neighbourhood of Orange in the south of France. René de Nassau, nephew and successor of Philibert de Challon, Prince of Orange, was killed at the siege of St. Dizier in 1544, and left his heritage to his cousin William of Nassau, the founder of the republic of the Dutch United Provinces. After the death of William III. King of England, the principality passed to Frederic King of Prussia, William's eldest sister's son, whose successor Frederic-William ceded it to Louis XIV. at the peace of Utrecht. The principality then merged in the province of Dauphiné, and is now included in the department of Vaucluse.

ORANGE, the ancient *Arausio*, an ill-built town, with a tribunal of first instance, a college, and 8633 inhabitants, is situated in the French department of Vaucluse near the left bank of the Rhone, on a beautiful plain watered by the Aigue and several other small streams, in 44° 58′ N. lat., 4° 48′ E. long., at a distance of 16 miles N. from Avignon. The town has some manufactures of printed cottons, handkerchiefs, serge, and silk; it has also a good trade in wine, brandy, oil, madder, saffron, honey, wool, corn, truffles, essences, &c. Orange abounds in Roman remains. A triumphal arch, commonly called the Arch of Marius, 60 feet high, consisting of a central arcade and two smaller lateral ones, separated by four Corinthian pillars, spans the high road at the northern entrance to the town, and is justly dear to archæologists for the beauty of its architecture, and the rich sculptures of its illustrative bas-reliefs. The northern façade of the theatre, which still stands in the

centre of the town and presents a gigantic rectangle 485 feet long and 115 feet high, is a most magnificent piece of masonry. It consists of five stories, and is built of large uncemented stones. The basement story has a grand entrance gateway in the centre supported by Corinthian pillars with capitals of white marble; on each side of the principal entrance are 9 arcades separated by Doric pilasters. The third story consists of 21 sunk arches of beautiful workmanship. The fifth story presents a row of large projecting square stones, corresponding to a similar row at the top of the fourth story, and pierced by holes intended to receive the poles which sustained the awning (velaria)-that covered the spectators in the interior of the theatre. The interior has been lately cleared of rubbish, and the huts that were built in it, and now presents a perfect view of the several parts of a Roman theatre, but deprived of all its ornaments. (*Dictionnaire de la France.*)

ORANG-UTAN. [APE.]

ORATO'RIO (Italian), a sacred musical composition, consisting of airs, duets, &c., and choruses. The text is generally a dramatic poem, as Handel's 'Samson' and Cimarosa's 'Sacrifizio d'Abramo.' Sometimes it takes the form of a narrative, as 'Israel in Egypt;' and occasionally it is of a mixed kind, as Haydn's 'Creation. The 'Messiah' is a collection of passages from our received translation of the Scriptures.

Something analogous to the oratorio was known to the church in the middle ages; but the modern oratorio arose about 1540 in Italy. Stradella was one of the first of those who distinguished themselves in this exalted kind of composition. The increasing popularity of the sacred drama at length induced poets of eminence to employ their pens in its service.

The Oratorio was introduced into England in 1720, when Handel set 'Esther'—Racine's tragedy abridged and altered by Mr. Humphreys—for the chapel of the Duke of Chandos at Cannons. This, in 1731, was performed by the Children of the Chapel-Royal, at the house of their master, Bernard Gates; and in the next year at the King's Theatre. For a period of about a century, with few interruptions, Oratorios were performed at one or other of the London theatres on the Wednesdays and Fridays in Lent. Within the last few years they have been performed almost weekly at Exeter Hall.

ORATORY. The matter of which oratory consists is the language, and the expression of it. The language is the medium by which the meaning of the speaker is conveyed, which may be written or spoken. It is true that oratory properly implies spoken language; but it does not exclude the circumstance of the speech being first written; and indeed, it is probable that all the best speeches have been written before they were delivered. Those speeches, such as the orations of Cicero and Demosthenes, and many others of modern times, which have deserved celebrity, can now only be viewed as written compositions, though, in forming our estimate of them, we must judge of them with reference to their matter and object, and consequently with reference to delivery.

So far as concerns the matter and the language, an oration or speech must be judged of like any other composition, with reference to its purpose, and the adaptation of it to such purpose. Accordingly there are various kinds of speeches or oratory adapted to various circumstances, to public deliberative assemblies, to courts of justice, to the pulpit, and so forth.

The delivery of an oration is a distinct thing. It is the giving a material and sensuous form to the written language, by means of action or gesture, and of speech or elocution, a term which may indeed comprehend the whole of delivery.

Elocution is that pronunciation which is given to words when they are arranged into sentences and form discourse. It includes the tones of voice, the utterance, and enunciation of the speaker, with the proper accompaniments of countenance and gesture. The art of elocution therefore may be defined to be that system of rules which teaches us to pronounce written or extemporaneous composition with justness, energy, variety, and ease; and agreeably to this definition, good reading or speaking may be considered as that species of delivery which not only expresses the sense of the words so as to be merely understood, but at the same time gives them all the force, beauty, and variety of which they are susceptible.

ORB, ORBIT. The word *orbis* signifies the circumference of a circle or of any round body, and *orbs* among the ancient astronomers meant the vast crystal spheres in which the heavenly bodies were supposed to be placed, and with which they revolved; hence orb came to be used for a sphere, as when the sun is called the *orb of day*. The word orbit now means the relative path in which a planet travels round the sun or a satellite round its primary.

ORBEC. [CALVADOS.]

ORCA'GNA, or L'ARCA'GNUOLO, is the name by which *Andrea di Cione*, is generally known. He was painter, sculptor, and architect; was born at Florence in 1329, according to Vasari, or according to other accounts about 1315 or 1320. He painted several works, together with his brother Bernardo, in the churches of Florence, and also in the Campo Santo at Pisa, where the Triumph of Death and the Last Judgment were by Andrea, and the Hell by Bernardo. He had painted previously in the Strozzi chapel in Santa Maria Novella, a picture of Hell from Dante's 'Inferno,' in which he introduced several portraits. As an architect he built the Loggia de' Lanzi in the Piazzi Granduca at Florence; also the church of the monastery of Or' San Michele, and designed the celebrated tabernacle of the virgin of that monastery. He was also a poet. Vasari mentions some sonnets which he addressed to Burchiello. He died at Florence according to Vasari in 1389, but according to Manni in 1375.

ORCHARD. Apples, pears, and cherries are the fruits principally cultivated in orchards. The term orchard is likewise used to signify inclosures in which filberts or walnuts are grown. The term yard is commonly used for similar spaces appropriated to the production of figs and grapes.

Orchards of apples and pears are more numerous, because more productive, on the old and new red-sandstone formations than on any other strata; a very large proportion of all the cider and perry that is manufactured is grown upon these soils. The principal orchards of England are in Devonshire, Somersetshire, Gloucestershire, Herefordshire, and Worcestershire.

For an orchard of apple-trees, a deep unctuous soil should be selected, in a situation sheltered from the north and north-west winds, and open to the south and south-east; and a bank is preferable to a low spot, for not only is the blossom more liable to be injured by spring frosts where fogs and damp prevail, but the trees themselves become mossy, and perish from excess of moisture.

For pear orchards a lighter soil is desirable than for apples; the same rules may be observed for their planting and preservation.

The principal cherry-orchards in England are in Buckinghamshire and Kent; from the latter county a large supply is sent to the London markets.

ORCHES'TRA, a word which contains the same element as ὀρχεῖσθαι, *to dance*, was that part of a Greek theatre in which the chorus was placed, and where the dances were performed. With the moderns, the Orchestra is the place in the theatre allotted to the instrumental band, and that portion of a concert-room which is assigned to the musical performers, both instrumental and vocal.

ORCHIDA'CEÆ are endogenous plants, with the stamens and style consolidated into a central column, and with an inferior ovary; they constitute the whole of the class *Gynandria Monandria* of the Linnean classification. There is no order of plants the structure of whose flowers is so anomalous, as regards the relation borne to each other by the parts of reproduction, or so singular in respect to the form of the floral envelopes. In consequence of the singular forms, the gay colours, and the delicious fragrance of many of these plants, they have of late years been cultivated with great zeal, both in this country and abroad.

Orchidaceous plants inhabit all parts of the world, except those which are excessively dry or excessively cold, both of which appear uncongenial to their nature, and they are most abundant in such as have an equable mild climate, moist and warm during the greater part of the year. Thus, we have not a single species from Melville Island or Nova Zembla, or from the upper regions of northern mountains, nor from the deserts of Africa; and the whole province of Mendoza, one of the dry western states of South America, produces but one, and that in a marsh. On the contrary, the woods of Brazil and equatorial America, of the lower ranges of the Himalayas, and of the Indian Archipelago, possess countless myriads of these productions. In general in hot countries the species are epiphytes, inhabiting the branches of trees, or the sides of rocks and stones, to which they cling by means of long twisting fleshy roots.

The roots are of the following kinds:—Firstly, annual slender fibres, simple or branched, of a succulent nature, incapable of extension, and burrowing under ground, as in the genus *Orchis*. Secondly, annual fleshy tubercles, round or oblong, simple or divided, as in the various species of the same genus; they are always combined with the first, and appear, from their containing amylaceous granules in large quantity, to be intended as receptacles of matter fit for the nutrition of the plant. Thirdly, fleshy, simple, or branched perennial bodies, much entangled, tortuous and irregular in form, as in *Corallorhiza*, *Neottia*, &c., or nearly simple, and resembling tubers, as in *Gastrodia*. And fourthly, perennial round shoots, simple or a little branched, capable of extension, protruded from the stem into the air, adapted to adhering to other bodies, and formed of a woody and vascular axis covered with cellular tissue, of which the subcutaneous layer is often green, and composed of large reticulated cells.

The stem is found in its most simple state in the terrestrial *Ophrydeæ*, where it is only a growing point, surrounded by scales and constituting a leaf-bud when at rest, which eventually grows into a secondary stem or branch, on which the leaves and flowers are developed. In other cases the growing point becomes perennial, thickens, is scarred with the remains of leaves which once grew upon it, and assumes the state of a short, round, or ovate perennial stem or pseudo-bulb. In another sort, the rhizoma, instead of having pseudo-bulbs, forms short stems, which are terminated by one or more leaves, as in *Pleurothallis* and its allies, and in the genus *Cattleya* and others; these differ from the pseudo-bulbous species only in the thickness and form of their axes.

The leaves are very uncertain in their appearance: usually they are sheathing at the base, and membranous; but in *Vanilleæ* they are hard, stalked, articulated with the stem, and have no trace of a sheath. Frequently they are leathery and veinless, as frequently they are membranous and strongly ribbed, and both these conditions occur in the same genus, as in *Maxillaria* and *Cypripedium*. In a large number of the epiphytal species the leaves are notched unequally at the apex, a singular structure which has not yet been noticed in those with membranous leaves.

Their floral envelopes are constructed irregularly upon a ternary type, and consist of three exterior and three interior pieces. The exterior pieces are usually nearly equal, and less brightly coloured than the interior; but the two lateral ones are often of a somewhat different form from the other, which is anterior when the flower is placed upon the inflorescence when young, but which often becomes posterior when the flower is expanded, in consequence of the flower-stalk being twisted or curved. Various modifications of the exterior pieces occur, but in all cases the whole number, three, is present. The interior pieces are usually three, never more; but in the instances of *Monomeria* and *Aviceps*, the intermediate one only is present. They are generally unequal, the two lateral pieces corresponding in form and size, while that between them, called

the lip, is of some other form and size: in the genus *Thelymitra* however, and in *Paxtonia*, they are all alike. Nothing can be more variable than the proportions they bear to each other and to the exterior pieces. It is through the modifications of these organs that the flowers of this family assume powers which have led to their being compared to insects and other objects.

It is usual to call the exterior series of floral envelopes calyx, and the interior corolla; but the analogy of *Maranteæ* renders it probable that the so-called petals are a row of outer sterile stamens. This however is a point upon which it is not here necessary to enlarge.

The centre of a flower is occupied by a body called the column, which is formed by the consolidation of the style and true stamens. In the greater part of the order there is but one stamen present, and it is in that case placed opposite the intermediate sepal, and consequently alternate with the lateral petals; when, as in *Cypripedium*, there are two stamens present, then the usual stamen remains in its customary position, in a sterile state; and the two perfect stamens are additional, and placed right and left of it.

In the greater part of the order a single anther terminates the column. This is usually two-celled, but often has its cells divided into two or four other cavities, by the extension of the endothecium between the lobes of the pollen-masses, or is occasionally more or less completely one-celled by the absorption of the connective.

The pollen consists of lenticular or spheroidal grains, either single or cohering in pairs, threes, or fours, or in larger masses in indefinite number. The grains are usually held together by an elastic filamentous substance, which in all *Ophrydeæ* and many others forms an axis round which the grains or masses of grains are arranged, and which in a very large part of the order assumes the appearance of a strap or caudicula.

The ovary adheres firmly to the tube of the calyx, and is often so twisted, when the flower is about to expand, that its back, with the floral envelopes belonging to it, is turned to the front. It consists of three perfect carpels, stationed alternately with the stamens opposite the petals, and bearing the placentæ in their axis, and of three other pieces alternate with the first, destitute of placentæ, and eventually separating from them when the fruit is ripe.

The stigma is a viscid excavation in front of the anther, and just below it. In most cases it is quite simple, merely terminating in a glandular dilatation of the upper margin, called the rostellum. It is lined with a lax tissue composed of minute ascending jointed hairs, and has a direct communication with the cavity of the ovary, either open or only imperfectly closed up.

The fruit is usually a capsule of six valves, bursting when ripe and discharging a multitude of minute seeds, with a netted loose tunic. In *Vanilla* however and some other genera the fruit is succulent, and the seeds have a hard brittle integument immersed in aromatic pulp.

Impregnation in *Orchidaceæ* was at one time thought to take place in a peculiar manner, by intersusception of the fertilising principles of the pollen-grains. It has now however been proved experimentally by Brown, A. Brongniart, Morren, and Lindley, that it in reality takes place only by the application of pollen-grains to the mucous surface of the stigma, as in other plants.

ORCHIL, or ORCHELLA, also written *Archil*, is the name of a dye as well as of the plant (one of the tribe of Lichens, or Rock-Moss) which yields it. [ARCHIL.] It is often corrupted in commerce into Rochilla Weed. Several kinds are employed for the same purpose, which are distinguished according to the country from whence they are imported, and also by manufacturers into Weed and Moss, the former name being applied to the filiform lichens of botanists belonging to the genus *Roccella*, while the terms Moss and Rock-Moss are applied to the crustaceous lichens belonging to the genus *Lecanora*, which include the Cudbear and Parelle of dyers.

R. tinctoria, Dyers' Roccella, or Orchil, and *R. fuciformis*, Flat-Leaved Orchil, are both found on maritime rocks, as well on the coast of England as of other parts of Europe, and also of Asia, Africa, and America. They are also found on dry stone walls exposed to the influence of the sea-breeze. The more arid the situation, the better is the quality of the lichens. The presence of the colouring matter is ascertained by steeping the weed broken up in small pieces in diluted solution of ammonia, in a bottle half filled with liquid, which should be kept corked, but frequently opened in a temperature not exceeding 150° Fahr.

ORCHO'MENUS, called the 'Minyean,' and afterwards 'the Bœotian,' was a city on the western shore of the Lake Copais, in Bœotia. In the earliest period of Grecian history it was known as a place of great power and wealth. Müller (*Orchomenus und die Minyer*) has a treatise on Orchomenus.

ORDEAL. Blackstone ('Comm. on the Laws of England,' 'Of Trial and Conviction') says:—'The several methods of trial and conviction of offenders established by the laws of England were formerly more numerous than at present, through the superstition of our Saxon ancestors, who, like other northern nations, were extremely addicted to divination, a character which Tacitus observes of the ancient Germans. They therefore invented a considerable number of methods of purgation, or trial, to preserve innocence from the danger of false witnesses; and in consequence of a notion that God would always interpose miraculously to vindicate the guiltless. The most ancient species of trial was that by Ordeal; which was peculiarly distinguished by the appellation of *Judicium Dei*, and sometimes *Vulgaris Purgatio*, to distinguish it from the canonical purgation, which was by the oath of the party.' The trial by ordeal in England was of two sorts, either Fire Ordeal or Water Ordeal. Fire Ordeal was performed either by taking up in the hand a piece of red-hot iron, of one, two, or three pounds weight; or else by walking, barefoot and blindfold, over nine red-hot ploughshares, laid lengthwise at unequal distances; and, if the party escaped being hurt, he was adjudged innocent; but if it

happened otherwise, as without collusion it usually did, he was then condemned as guilty. Water Ordeal was performed either by plunging the bare arm up to the elbow in boiling water, and escaping unhurt thereby; or by casting the person suspected into a river or pond of cold water, and if he floated without any action of swimming, it was deemed an evidence of his guilt, but if he sunk, he was acquitted. There were several other species of ordeal in use in different countries.

ORDER IN COUNCIL. This expression is chiefly known in connection with the measures taken by the British government in 1807 and 1809, in retaliation of the Berlin and Milan decrees of Napoleon, by which Great Britain and her colonies were declared in a state of blockade. [BLOCKADE.] These orders were an arbitrary and tyrannical measure. In order to form a just opinion of them, a man should read what the writers of other nations have said of them, rather than what has been urged in their defence in England.

It is difficult to draw the line between what may and what may not be accomplished by Order in Council. There have been various occasions on which, in cases of emergency, orders in council have been issued contrary to law, and those who have been concerned in passing, promulgating, or enforcing them have trusted to legislative protection, and taken on themselves the personal responsibility of the proceeding. In the year 1766, when there was a deficient harvest and the prospect of famine, an order in council was issued prohibiting the exportation of corn from the British ports. In the immediately ensuing parliament the act 7 Geo. III. c. 7 was passed for indemnifying all persons who had advised the order or acted under it, and for giving compensation to all who had suffered by its enforcement. The act in reference to the order declared, 'which order could not be justified by law, but was so much for the service of the public, and so necessary for the safety and preservation of his majesty's subjects, that it ought to be justified by act of parliament.' There are some matters affecting trade and the revenue, as to which orders in council are specially authorized by act of parliament. Thus in the Customs' Duties Act, when there is any scale of duties to be paid by the subjects of a state having a treaty of reciprocity with Britain, it is enacted that the treaty of reciprocity, and consequently the right to import at the lower duties, shall be declared by order in council. By the International Copyright Act, 1 & 2 Vict. c. 59, the countries which, by their conceding a term of copyright to works published in Britain are to enjoy a similar privilege here, may be declared by order in council.

ORDERS, HOLY. [ORDINATION.]

ORDINARY. This term commonly signifies the bishop of the diocese, who is in general, and of common right, the ordinary judge in ecclesiastical causes arising within his jurisdiction. (Lindwoode's 'Provinciale,' lib. i. tit. 3.) The term is also applied to the commissary or official of the bishop, and to other persons having, by custom or peculiar privilege, judicial power annexed to their offices or dignities. Thus an archdeacon is an ordinary. A bishop therefore is always an ordinary, but every ordinary is not a bishop.

ORDINATE is that particular rectangular Co-Ordinate of a curve which is measured perpendicularly to one of the axes and not upon an axis. [CO-ORDINATES.]

ORDINATION, the ceremony by which holy orders are conferred, or by which a person is initiated into the ministry of religion, or set apart for preaching, administering the sacraments, and discharging other ecclesiastical rites and duties, public or private. In the Church of England a candidate must be twenty-three years of age before he can be ordained deacon, and twenty-four before he can be ordained priest; must have an appointment to some cure, except he be a fellow of a college; bring letters testimonial of his life and doctrine, for three years, from three beneficed clergymen; undergo an examination in Latin, Greek, and theological learning; subscribe to the Thirty-nine Articles, and the Liturgy; and, as bishops now almost invariably require, have graduated at one of the English universities, at Trinity College, Dublin, or at some other recognised school. No person can hold any vicarage, rectory, or benefice, whatever, except he be in full orders.

ORDNANCE, a general term applied to the great artillery (guns, carronades, howitzers, and mortars) used in war; the name being probably derived from the *Compagnes d'Ordonnance*, instituted in 1448 by Charles VII. of France.

The wars between the emperor Charles V. and Francis I. gave rise on the Continent to the first important improvements in the construction and use of heavy artillery. It was not however till the beginning of the 17th century that artillery, which had before been chiefly used in the attack and defence of fortresses, began to be extensively employed in engagements between hostile armies. The employment of Horse Artillery, as it is called, was first proposed by the Prussian General Scharnhost; and Military Rockets were invented by Sir W. Congreve.

The materials of which ordnance is formed are iron and brass, properly bronze, the latter metal being composed of copper and tin, in the proportion of from 8 to 12 parts of tin to 100 parts of copper. Iron guns are stronger than those made of brass, and consequently they are better able to resist the effects of the long-continued firing which takes place at the sieges of fortresses. Brass guns, on the other hand, being lighter, are more conveniently transported from place to place with troops in the field.

Ordnance is now cast either in loam or in dry sand; a model, or pattern, of the gun being made of wood or brass, about which the mould is formed. In twelve hours after being cast the mould may be removed and the gun may be bored.

Iron guns are cast from pig-metal of different qualities, which are melted together in order to produce a composition possessing only that degree of hardness which will permit the boring to be

effected. Ordnance formed of cast-iron and of gun-metal being apt to run at the vent in consequence of the heat produced by rapid firing, the vent in guns of cast-iron is drilled in a bolt of wrought-iron, and in those of gun-metal in a bolt of pure copper; the bolts are then screwed into the pieces for which they were intended.

The length of a cannon is divided into six parts:—That which is behind the base ring (the ring of greatest diameter) at the larger end is called the *cascable;* and from the base ring to the next mouldings towards the smaller end, is the *vent-field.* The two succeeding portions, separated from one another by a moulding, are called the first and second *reinforce;* and near the extremity of the latter are situated the *trunnions,* two cylinders at right angles to the axis of the gun, and by which it rests on its carriage. From the second reinforce-moulding to another near the smaller extremity of the gun is the *chase,* and the last portion is called the *muzzle.* The hollow of the gun is called the *bore,* and the diameter of the bore is designated the *calibre* of the piece.

A scale of quarter degrees is graduated on the base ring, which, the breech being lowered till one of the divisions and the notch on the side of the muzzle are in a line with the object, serves to give the axis an inclination to the horizon, which is denoted by the number of the division. A point-blank disposition of the gun is that in which the zero notch on the base ring and that on the side of the muzzle are made to coincide in direction with the object, whether this line of direction be or be not parallel to the horizon. But when a notch on the top of the base ring and one at the top of the muzzle are made to coincide in direction with the object, the gun is said to have the line of metal elevation.

For elevations greater than three degrees a tangent scale is employed; this is a brass rod which slides up and down in a groove formed in the direction of a diameter to the base-ring of the gun, and is divided into quarter degrees. In using this scale the latter is drawn up till the graduation expressing the intended elevation is at the surface of the base ring; then the breech of the gun is lowered till a notch at the top of the scale and that at the top of the muzzle are in a line with the object.

It has of late been found practicable to diminish considerably the quantity of metal in iron guns; and for this purpose some of the ordnance then existing was *reamed-up* (scraped out), so as to bring each kind of gun to the next highest calibre. Thus the old iron 6-pounders have been converted into 9-pounders, 18-pounders into 24-pounders, and so on. The practice was first recommended by Colonel Paixhans, in France, and it has lately been adopted in this country.

The application of locks to naval ordnance was introduced by Sir Charles Douglas (captain of the fleet to Admiral Rodney in the action of 1782), and their efficiency has since been fully recognised. A lock carrying two flints, invented by Lieut.-Gen. Sir Howard Douglas, in 1818, was afterwards introduced, and percussion locks are now much used in the British service.

From experiments made in France it has been ascertained that hollow shot, being with equal weight greater in diameter than such as are solid, when fired with low charges of powder against ships, produced most dangerous breaches in their sides; and, in consequence, certain heavy iron howitzer-guns for discharging such missiles have been introduced in the French navy. A conviction of the necessity of using these powerful arms in a future war has led the British government to adopt them in the royal navy, and now the ships of war always carry a certain number of such guns on their lower decks.

Experiments also have been made on the effect of loaded or live shells as they are called, when projected horizontally into ships, the fuzes of the shells being regulated so that the latter may explode as soon as they have pierced the side; and it is easy to conceive that the consequences must then be most destructive. The shells are kept loaded on board of ships, in separate boxes, and for greater safety the fuze of each is covered with a metallic cap till the moment when the shell is required to be put in the gun.

Table of the Lengths and Weights of various Pieces of Ordnance.

Iron Ordnance.	Length. ft.	Length. in.	Weight. cwt.
13-inch mortar, sea-service	3	0½	36½
10-inch do. land-service	2	4	16½
8-inch do. do.	1	10½	8¾
5½-inch do. do.	1	3	2½
4⅘-inch do. do.	1	0¾	1½
10-inch howitzer do.	5	0	41
8-inch do. do.	4	9	21
Monk's 56-pr. gun do.	11	0	97
Millar's 10-inch gun do.	9	4	84
8-inch gun, sea-service	9	0	65
32-pr. gun, land-service	9	6	56
24-pr. do. do.	9	6	48
18-pr. do. do.	9	0	42
12-pr. do. do.	9	0	34
32-pr. carronade, sea-service	4	0	17
24-pr. do. do.	3	7	13
18-pr. do. do.	3	4	10
12-pr. do. do.	2	8	6¾
Brass Ordnance.			
9-pr. gun, land-service	8	6	13½
6-pr. do. do.	5	0	6
3-pr. do. mountain-service	3	0	2½

Carriages.—Carriages for ordnance are of several kinds, according to the nature of the arm or the manner in which it is employed.

Field gun-carriages consist of two cheeks, or side pieces, of elm, firmly attached together by transoms, and resting on the axle-tree of the wheels; the trail, consisting of a solid piece of oak, is firmly attached at one end to the side pieces, near the axle, and its other extremity rests on the ground when the gun is in a state for action. The limber is a bed, with shafts, mounted on two wheels, and carrying two ammunition boxes for the service of the gun; the horses are harnessed to the limber, and the gun with its carriage is

drawn after the limber. An ammunition waggon also accompanies each piece of ordnance, and there are others always in reserve.

Field howitzer-carriages and their limbers are similar to those just mentioned, but stronger, and the cheeks of the carriage are farther asunder.

The travelling carriages for siege-ordnance are made wholly of oak, and the limber carries no ammunition. Carriages for garrison service and for the navy consist of two short cheeks or brackets, connected by *transoms*, and they move on four truck-wheels. Mortars are placed upon solid beds of wood or iron, which are made as heavy as is consistent with the power of transporting them from place to place, for the sake of obtaining steadiness when the piece is fired.

The artillery, which accompanies an army into the field, is formed into *batteries*, each consisting of *six pieces*, usually 5-pounder or 12-pounder guns and one howitzer. In determining the quantity of artillery for an army it is usual to allow one gun for every 500 men of infantry, and one piece of horse-artillery for every 250 men of cavalry.

The guns hitherto employed in the attack and defence of fortresses have been 12, 18, and 24-pounders: the last are used in the formation of breaches, and the others for the purpose of dismounting the enemy's artillery by direct or by ricochet firing.

ORDUÑA. [Basque Provinces.]

OREBRO. [Sweden.]

OREGON. The country known by the name of Oregon extends from 42° to 54° 4′ N. lat., and from the Rocky Mountains to the Pacific Ocean. It occupies a space of about 13° of latitude and 15° of longitude. Besides the Rocky Mountains there are two other ranges, one called the Cascade Mountains, and the other the Blue Mountains, dividing the country into three divisions. The country between the Rocky Mountains and the Blue Mountains is almost uninhabitable by those who depend on agriculture. In the middle district rain never falls from April to November, and the soil is unpromising. The western district may be calculated, from 42° to 48° 30′ N. lat., to be 6½° in its extreme length, or less than 450 miles, and its average breadth about 100 miles, that is, 45,000 square miles is the area of this westernmost region of Oregon. Indian corn does not succeed in any part of Oregon, from deficiency of rain. The valley of the river Willametty, a tributary of the Columbia, which is the most fertile district, is about 150 miles long and 60 miles broad. Wheat produces here from 20 to 30 bushels an acre. The winters are wet and stormy.

The Columbia River rises in the Rocky Mountains, in 50° N. lat., 116° W. long. It flows first N. by W. and then S. by W. to Fort Colville, where it is 2049 feet above the sea-level, having fallen 550 feet in 220 miles. Thence it flows W. 60 miles, and then S. 160 miles to 45° N. lat., where it is 1286 feet above the sea-level, and 3500 feet wide. From this point it flows W. 80 miles to the Cascade Mountains, through which it passes in a series of falls and rapids, and then continues its course W. 160 miles to the Pacific Ocean. It receives many tributaries. Its entire length is about 680 miles. The entrance at the mouth is rendered difficult and dangerous by sand-banks.

The territory north of the Columbia River and south of the parallel of 49° N. lat., is that which was in dispute between the governments of Great Britain and the United States. That dispute was definitely settled by the conventions of 1839 and 1846. The boundary line between the British territory and that of the United States is stated in the article British America.

The American *Territory of Oregon*, as thus limited, is bounded N. by the parallel of 49°, S. by the parallel of 42°, E. by the Rocky Mountains, and W. by the Pacific Ocean. The area is estimated at 341,463 square miles. An Act to constitute the Territory of Oregon was passed by Congress, August 14, 1848.

OREGRUND. [Sweden.]

OREL, a government of Great Russia, is situated between 51° 50′ and 55° N. lat., 32° 50′ and 39° E. long. It is bounded on the N. by Kaluga, on the N.E. by Tula, on the E. by Tambow, on the S.E. by Woronetz, on the S. by Kursk, on the S.W. by Tschernigow, and on the N.W. by Smolensk. Its area is about 17,000 square miles. The population is about 1,500,000.

The country has a considerable elevation, but it contains no mountains. The principal rivers are the Desna, Oka, and Sosna. There are no large lakes, but the province is extremely well watered by streams.

Orel is one of the most fertile provinces of the empire. All kinds of corn are cultivated, a little flax, much hemp, and in some places tobacco. Horticulture is pretty general; and timber is plentiful. Fur animals are few in number, but domestic animals and birds are very abundant. The mineral products are lime, millstones and grindstones, alabaster, saltpetre, and bog-iron. There are no manufacturing establishments in the villages, and few mechanics. The country-people make for themselves almost everything that they have need of. There are however some manufactories in the towns. The articles of export are numerous. Almost all articles of foreign produce and manufactures of which the inhabitants are in want are procured from Moscow.

The inhabitants are partly Great Russians, partly Little Russians and Cossacks. The majority are of the Russian Greek church, and the head of the clergy is the bishop of Orel and Siäwsk.

Orel, the chief town of the government, is situated in 52° 56′ 40″ N. lat., and 36° 6′ E. long. It stands on the river Oka, where it is joined by the Orlik. The houses are in general of wood, and the interior of the town is gloomy. The population is about 40,000. Orel is well situated for trade; it is the entrepôt for the corn of Little Russia, and the place from which Moscow draws its chief supply. Besides the buildings belonging to the crown, there are 20 churches, 2 convents, a gymnasium and other schools, and a bazaar.

The other principal towns in this government are—Siäwsk (or Sewsk), with 5000 inhabitants;

Briänsk on the Desna, with 5000 inhabitants, a seminary, a canon foundry, tanneries, and much trade with Kherson; Karatscheff, with 6000 inhabitants; Trubtschewsk, on the Desna, an ancient town, with 3500 inhabitants; Dmitrowsk has 3000 inhabitants; Kromy, 2000 inhabitants; Maloi-Archangelsk, 1500 inhabitants; Liwny, on the Sosna, 6000 inhabitants; Jeletz, on the Sosna, with 8000 inhabitants, has a great trade in iron wares and corn; Mzensk, at the junction of the Mezna and the navigable river Sudscha, has 6000 inhabitants; Bolchow, on the Nugra, is a well-built town, with 14,000 inhabitants. These 12 towns, including Orel, are the capitals of 12 circles of the same names.

ORELLA'NA. [AMAZON.]

ORELLA'NA, FRANCISCO, the first European who traversed the continent of South America, was born at Truxillo, in Spain, early in the 16th century. He accompanied the expedition of Francisco Pizarro to Peru in 1531. In company with Gonzalez Pizarro, Orellana in 1540 undertook to seek for a district east of Quito, which was said to abound in gold, silver, and spices. They explored the country to the east of the province of Zumaco, and followed the course of a river, supposed to be that branch of the Marañon called the Napo, for 200 leagues, when provisions became scanty, and Orellana was ordered to proceed down the river in the bark which they had built, and to return immediately. He went forward until he arrived at the confluence of this branch with the main stream. He found however nothing but impenetrable forests and flooded plains. Either the ambition of discovery or the utter inability of his exhausted crew to row back against the heavy stream induced him to proceed. They experienced many difficulties, but at length reached the sea in August 1541, having navigated this vast river above 1000 leagues. On Orellana's visit to Spain the king granted him extensive possessions, and he returned to the Amazon in 1549, where he soon died from the effects of the climate.

ORENBURG, the most westerly government of Asiatic Russia, is situated between 47° and 56° N. lat., 50° 20′ and 64° 20′ E. long. It is bounded on the N. by Perm, on the N.W. by Wiätka, on the W. by Casan, Simbirsk, Saratof, and Astrachan, on the E. and S. by the steppe of the independent Kirghises, and on the north-eastern extremity by Tomsk and Tobolsk. The area is about 120,000 square miles, and the population about 1,893,000.

Towards the south, in the country of the Cossacks of the Ural, the government is a steppe, which is destitute of trees, and only produces the plants peculiar to saline countries. Beyond the mountains it is a plain intersected by morasses and a great number of lakes. To the north, where the Ural chain enters the government, it is called the Baschkirian Ural; the part which runs directly south, parallel with the river Ural, which it meets by making a sudden bend from east to west, is called the Gouberlin Mountains. The principal rivers are the Ural, Kama, Sakmara, and Belaia. The lakes are numerous.

Agriculture is in general flourishing, and is favoured by the goodness of the soil. The chief grains are rye, barley, oats, buckwheat, and millet. The inhabitants grow also some flax, hemp, tobacco, and vegetables. The forests are of immense extent. Cattle and horses are very numerous. The mineral productions include gold, copper, iron, salt, alabaster, agates, marble, and sulphur.

The population of Orenburg consists of Great Russians and Little Russians, besides some Finns, Cossacks, Tartars, Baschkirs, Teptjiars, Metscheriaks and Calmucks, Tchonvaches, Tcheremisses, Mordwins, Kissilbaches, and Armenians. The majority are Russians. Most of the inhabitants belong to the Greek church. There are schools belonging to all the religious bodies.

There are few manufacturing establishments in comparison with the extent of the country, the inhabitants in general being able to provide for their own wants. The women are extremely skilful in weaving and dyeing. The working of the mines employs a great number of hands. But manufacturing industry has made considerable progress within the last forty years. Much of the foreign trade is conducted by caravans from and to Central Asia.

The civil government is organised like those in Great Russia, but does not extend to the Kirghises and Cossacks, who are under a military governor, whose chief business is to provide for the security of the frontier.

Orenburg, formerly the capital of the government, is situated in 51° 46′ N. lat., and 52° 31′ E. long., in a vast plain at the conflux of the Sakmara and the Ural: it is of an oval form, pretty regularly built, and well fortified. The population is stated to amount to 20,000. There are nine Greek churches, one Lutheran church and school, a military academy for eighty pupils, a great European bazaar with 180 shops in the town, and an Asiatic bazaar with 492 shops in the Kirghis territory, a league from the town, which is the depôt for the merchandise of Central Asia and of Russia.

Ufa, the present capital, a fortified town at the conflux of the Ufa and the Belaia, has 6000 inhabitants, half of whom are Tartars. The public institutions and buildings are—a gymnasium, a poor-house, a lunatic asylum, seven churches, and two convents.

OREODAPHNE, Mountain Laurel, a genus of plants belonging to the natural order *Lauraceæ*. *O. opifera* is native of the woods of Para and the Rio Negro. It is used in Brazil as a remedy in pains and contractions of the limbs. *O. cupularis* is a very large tree, with a strong-scented wood. This species is the cinnamon of the Isle of France, where it grows, and also in Bourbon and Madagascar.

ORFORD. [SUFFOLK.]

ORFORD, EARL OF. [WALPOLE.]

ORGAN, the noblest of musical instruments, whether considered in regard to the grandeur and beauty of its sounds, the variety of its powers, or the sacred purposes to which it is usually dedicated. It consists of a vast number

of metallic and wooden pipes, divided into different *stops*, the wind being admitted into the pipes from a bellows. It is played on by means of a key-board.

Originally the word *Organum* had a very extensive meaning, and signified nearly every kind of instrument, for whatever purpose employed. By degrees it was confined to instruments of music; afterwards it was applied only to wind-instruments; and finally it was exclusively used to designate the Organ. It must soon have been discovered that air may be forced into a closed cavity, and then distributed at will to one or more tubes; and pursuing the contrivance a little further, something like a modern organ was likely to be produced. That an instrument similar in principle, though not in details, to the modern organ, was known in very early times, there is abundant evidence to show. The period when the organ was introduced into the churches of Western Europe is very uncertain. Pope Vitalian is supposed to have been the first to admit the instrument, about the year 670; but the earliest account, to be at all relied on, of the introduction of this instrument in the West, is, that about the year 755 the Greek emperor Copronymus sent one as a present to Pepin, king of France. In the time of Charlemagne however organs became common in Europe. Before the 10th century they were not only common in England, but of large size. They were however very rude in construction, and extremely limited in means. The keys were four or five inches broad, and must have been struck by the clenched hand, in the manner of the carrilons: the pipes were of brass, harsh in sound, and the compass did not exceed a dozen or fifteen notes in the 12th century; and to accompany the plain-chant, no more were required. About that time half notes were introduced at Venice, where also the important addition of pedals, or foot-keys, was first made in 1470.

Most of the early English organs were destroyed by the Puritans. The tone of the pipes of the old builders—depending on what is technically called the *voiceing*—has never been excelled by later makers; but in point of *touch*, and mechanism generally, the moderns are much superior to their predecessors. In mechanical skill and delicate finishing the English organ-builders far surpass their continental rivals, while in tone they at least equal them.

The following are some of the largest foreign organs:—

	Stops.	Pipes.
Seville cathedral . . .	100	5330
Goerlitz, in Upper Lusatia	82	3270
Hamburg, St. Michael's .	67	
Amsterdam, the old church	64	
Weingarten, in Suabia .	60	6666
Rotterdam (150 feet high)		5500
Tours cathedral . . .	60	
Haarlem	60	5000.

Among the principal organs in England are those of York Minster, Birmingham Town-hall, and in London St. Paul's Cathedral, Westminster Abbey, Exeter Hall, and Christ's Hospital. The Apollonicon is a remarkable specimen of organ construction. [APOLLONICON.]

The mechanism of the organ is complicated. The *principle* of it is—that when the finger of the player presses down a key, or the foot presses down a pedal, a valve opens the lower end of a pipe or pipes, into which air rushes from a chamber wherein it has been condensed by bellows. The length and form of each pipe are so arranged that it may yield a certain definite note. Each *stop* is a particular set of pipes, differing in pitch, but all having the same character of sound. Some stops imitate the flute sound, some the trumpet sound, and so on. It is the combination of many stops with many octaves of notes that gives rise to the large number of pipes in an organ.

The *Barrel-Organ* is an instrument by which most of the effects of a small keyed-organ are produced by certain machinery. Instead of keys for the fingers, the keys, if so they may be called, are inside the organ, and acted on by means of a cylinder, or barrel, *pinned*, or studded, in a particular and singularly curious manner. This barrel is made to revolve by a winch, and in those of an expensive kind by wheel-work, moved by a spring.

ORGANIC REMAINS. By this term geologists understand the numerous reliquiæ of vegetables and animals which occur among the stratified rocks. Some of these objects are obviously parts of animals and plants, and retain their original structure, more or less altered by chemical agencies since their sepulture in the earth; others are earthy, stony, or metallic bodies, moulded within or upon parts of animals or plants, and thus resembling those parts in external aspect, but having none of their internal organic texture. Foot-prints of extinct animals, and the perforations of conchifers, are also included under the same term.

Judging from published catalogues and the course of discovery, the living creation may be estimated to contain 100,000 plants, and far more than double that number of animals. In a fossil state we may say, in round numbers, that 1000 plants and 10,000 animals have been accurately discriminated and classified. The numerical proportions vary according to the groups of plants and animals selected for comparison.

Organic fossils bear so general an affinity to existing races, that they may all be conveniently ranked in the same great classes; generally in the same great orders and families; sometimes in the same genera; but rarely, and only in the most modern strata, in the same species.

The imperfection of innumerable specimens of fossil plants, shells, fishes, &c., is not entirely nor principally owing to the chemical and mechanical agencies which have been exerted to modify their aspect and substance; on the contrary, the broken condition of many fossil trees, and the scattered situations in which their stems, leaves, and fruits occur, and in some cases the loss of part of their structure, are to be ascribed to the turbulent action which accompanied their inhumation, and to the exposure and decomposition

which they had previously sustained. In whatever condition buried, the remains of plants and animals have been subsequently affected both by mechanical and chemical forces. The mechanical effect is evident among the shales and gritstones which cover coal; while the chemical changes in the substance of plants and the hard parts of animals, are found partly dependent on the original nature of the bodies, and partly on that of the rocks in which they occur.

The occurrence of organic remains is not known to be dependent on depth below the surface of the earth, or on particular height above it. Fossil plants occur in our deepest collieries, and fossil shells crown very lofty points of the Alps and Pyrenees. Yet it is evident that at the depth of a few thousand yards below the surface, in most situations, the traces of ancient life end. In like manner many mountain ranges are almost or absolutely deficient in fossils. On the whole, fossils are most numerous in the lower parts of the earth's surface, because the formations there occurring are generally of a later origin than the stratified rocks which are uplifted into mountain-chains.

The circumstance to which the laws of distribution of organic remains in the earth are most distinctly and constantly related, is the antiquity of the strata. In the oldest of all the strata known to geologists, few or rather no traces of organic life appear. Hence it is that organic fossils appear excluded from particular geographical areas, as for example frequently from the interior parts of great mountain-ranges, which are generally composed in a considerable proportion of these ancient primary strata. On the contrary, among the more recent of the marine strata—for example, the eocene tertiary strata of London and Paris—the number of organic fossils is prodigiously great. If these contrasted cases were the only ones which appeared to suggest a law that 'the number of organic fossils in the strata continually augmented from the earliest primary to the latest tertiary rocks,' they would deserve attention; but the supposition becomes changed into exact inference by comparing successively the systems of strata on a uniform plan.

Fishes are the only class of vertebrata found in all the systems of strata. Reptiles begin to appear, if not in the carboniferous system, certainly in the next above. Birds and mammalia appear locally and rarely in the oolitic rocks. If, lastly, we inquire in what part of the series of aqueous deposits the remains of Man have been found, we are not able to quote a single authentic example of any such occurrence except in loose surface soil, sand, gravel, and caverns, in which, not uncommonly, pottery, fabricated bones, and other marks of rude civilization, accompany the reliques of our progenitors.

By considering and comparing the organic remains which fill the successive systems of strata, we find that, as few living forms appear among the lower tertiaries, few or none of the tertiary forms appear in the lower parts of the cretaceous system: this system is in the same manner distinct from the mass of the oolites, these from the red-sandstones, the latter from the carboniferous rocks, and all from the palæozoic groups. Each of these systems of strata contains the reliquiæ of animals and plants which were in existence in the sea, in fresh waters, or on the land, at or previous to the time of the production of those strata; and, by combining the evidence derived from all, we arrive at a view, incomplete indeed, yet not necessarily inaccurate, of the succession of organic life upon the globe.

ORGANON. The question, What is Logic? has been a matter of much dispute. It has also been disputed whether logic is a science or an art, or both—an idle question, which may be safely left undecided.

There is no definition of logic in the extant works of Aristotle; and if we deduce from his 'Organon,' as we now have it, our notion of what the term comprehends, we shall find that it contains a great deal which does not belong to logic as it has been generally understood.

Dialectic is distinguished by Cicero ('Topica,' 2) from Topic. 'All exact argumentation,' he observes, 'consists of two parts, one comprehending invention (unam inveniendi), and the other judgment (alteram judicandi).' He assigns to Aristotle pre-eminence in both, and speaks of the Stoics as having especially applied themselves to the latter, which they named Dialectic. But the dialectic of the Stoics was certainly not confined to pure logic, as appears from what Cicero says in his treatise 'De Oratore' (ii. 38), and also from the statement of the Stoical opinions as to dialectic by Diogenes Laertius, in his Life of Zeno of Citium.

The meaning of the term Logic is explained by Kant with his usual clearness. Logic is the science of the laws of thought. Logic may be considered from two points of view, as General or Special. General logic comprehends only the necessary laws of thought, without which there can be no exercise of the Understanding, and it has no reference to any difference in the objects to which it is applied. Special logic comprehends the rules of thinking rightly on any given subject. General logic again, is either Pure or Applied logic. In the former we abstract from all empirical conditions under which our understanding is exercised, as for instance, the influence of the senses, imagination, memory, &c. A General and Pure Logic has consequently only to deal with pure *à priori* principles, and is a canon of the Understanding and of the Reason, but only in respect to the formal part of its use; the matter which is its object may be either empirical or transcendental. A General Logic is called Applied when it has reference to the rules of the exercise of the Understanding under the subjective empirical conditions, which we learn from psychology. It has consequently empirical principles, though it is so far General that it has reference to the exercise of the understanding without any distinction of objects. In General Logic consequently, the part which comprehends the pure doctrine of the Reason must be absolutely separated from that which is Applied, though still General Logic. The first part only is properly a science, though brief and dry, as the regular exhi-

bition of an elementary view of the Understanding must be. In this science, then, logicians must always bear two rules in mind:—

1. As General Logic, it abstracts from everything which the understanding contains as knowledge, and from all differences in its objects, and it has only to do with the pure form of thought.

2. As Pure Logic, it has no empirical principles, and consequently derives nothing (as has been sometimes supposed) from psychology, which therefore has no influence at all on the canon of the understanding. It is a demonstrated science, and everything in it must be absolutely *à priori* true. (Kant, 'Critik der Reinen Vernunft,' p. 55, &c., ed. 1828.)

By Applied Logic, Kant understands an exhibition of the understanding and the rules of its necessary exercise *in concreto*, namely, under those accidental conditions of the subject which may assist or impede its exercise, and all which are only empirical data. It treats of attention, its impediments and consequences, the origin of error, the state of doubt, conviction, &c.

General Logic then abstracts from all our knowledge, that is, from all relation of our knowledge to an object, and contemplates only the logical form in the relation of the parts of our knowledge to one another, that is, the form of thought generally. So far as truth is concerned, since logic is conversant only about the general and necessary rules of thought, the criterion of its truth must lie in these rules; and whatever contradicts them is false, for logic would then contradict itself. Yet though a logic may be consistent, that is, not self-contradictory, yet it may be contradictory to the object; consequently the bare logical criterion of truth, namely, the conformity of knowledge with the general and formal laws of thought and of the reason, is the *conditio sine quâ non*, and consequently the negative condition of all truth. Further however logic cannot go, and any error which affects not the form, but the matter, logic has no means of detecting.

Hegel has viewed logic in a somewhat different light, and given it a wider range. The difficulty of presenting anything like an adequate view of the principles of Hegel by a few extracts must be the apology for this imperfect attempt; the obscurity of the exposition, if such it shall appear, may be partly though not entirely due to the writer.

'That which is generally understood by the term logic, is viewed altogether independent of any metaphysical signification. In its present condition this science has no subject-matter (*inhalt*) in the sense in which subject-matter is considered as a reality, and as a truth in the ordinary acceptation of the term. But it is not for this reason a formal science which is devoid of truth. The region of truth however must not be sought for in that material which people expect to find in logic, and to the want of which its unsatisfactory nature is usually attributed; but the emptiness of logical forms rather lies in the way in which they are considered and handled. So far as logical forms, considered as determinate notions, are disjointed from one another, and not bound together in organic unity, they are dead forms, and have not in them the spirit which is their living concrete unity. Thus viewed, they have no solid subject-matter (*inhalt*)—no matter which of itself would be a real substance (*gehalt*). The subject-matter which is looked for in logical forms is nothing else than a firm foundation and concretion of these abstract determinations; and such a substantial essence is usually sought for beyond the bounds of the science. But the logical reason is itself the substantial or real matter, which unites in itself all abstract determinations, and is their solid absolute concrete unity. There was no need then to look far for a subject-matter, as it is usually called; it is not the fault of logic if it appears empty, but it is the fault of the way of considering it.'

'In forming judgments and conclusions, when the operations are especially referred to and grounded on the quantity of the notions, everything rests in an external difference, in a mere comparison, and becomes a pure analytical process and calculation void of all ideas. The deduction of the so-called rules and laws of conclusions in particular, is not much better than a handling of sticks of different lengths in order to sort them out and tie them up according to their magnitude—nothing else than the child's game of selecting and putting together the pieces of a picture which is composed of parts. This exercise of thought has accordingly not unaptly been compared with arithmetic, and arithmetic has been compared with it. In arithmetic, numbers are considered independent of any notions,—as something which, independent of their equality or inequality, that is, independent of their absolute external relation, have no signification; as something which, neither in themselves nor in their relations, express a thought. When it is mechanically ascertained that $\frac{2}{3}$ multiplied by $\frac{3}{4}$ make $\frac{1}{2}$, this operation contains just as much and just as little thought as the ascertainment whether in a given figure this or that conclusion can be made.'

Hegel remarks, that with respect to the formation of an individual mind, logic may be compared with grammar. Both logic and grammar are something different for him who first approaches them and science in general, and for him who comes back from the sciences to them. He who begins to learn grammatical forms and rules, sees in them nothing but themselves: he who has mastered a language, and compares it with other languages, is in a capacity to understand the full force of these rules and forms. Through the grammar he can reach the expression of the mind, the logic. The case is the same with a man's first introduction to logic: its signification is limited to itself. Logic must be first learned as something which a man comprehends and understands, but in which extent, depth, and further meaning are not discovered. It is not till we have a deeper acquaintance with the other sciences that the logical becomes for the mind, subjectively, not a mere abstract universal, but a universal which comprehends within it the abundance of the particular: just as the same moral maxim in the mouth of a youth, even if he

understands it correctly, has not the signification and the comprehensive meaning which it has in the mind of a man of long experience, to whom the words convey the full force of the expression. Thus the logical cannot be fully estimated until it is made the result of experience in the sciences: it then presents itself to the mind as the universal truth, not as a particular knowledge co-existent with other matter and realities, but as the essence of all other knowledge.

Logic has been defined (by Hegel) as 'the science of the pure thought, which has for its principium (*princip*) the pure knowledge (*wissen*); not an abstract, but a concrete living unity; and concrete in this way, that in it there are undeniably opposed to one another the consciousness of a subjective self-existence, and a second such existence, an objective; and that existence is known as a pure Notion in itself, and the pure Notion is known as the real existence. These then are the two momenta which are contained in the logical. But they are only known as existing inseparably, and not each in the consciousness as existing by itself; but it is only by virtue of their being also known as different (yet not self-existing) that their unity is not abstract, empty, and inactive, but concrete.

'This unity constitutes the logical principium (*princip*) as its element, so that the development of this difference, which is always in it, takes place *within* this element. Thus the entire notion is to be considered in the one case as existing Notion, in the other as Notion simply: in the former case it is notion by itself of reality or existence; in the latter it is notion as such, self-existing notion.

'Logic will therefore be divided into the logic of the notion as existence, and of the notion as notion; or, to make use of the common though very indefinite and ambiguous expressions, into the objective and subjective logic.

'Consistently with the fundamental element of the unity of the notion in itself, and the connected inseparability of its momenta, these momenta must be viewed also in their mutual relations, so far as they are different, and so far as the notion is considered with respect to a difference. Hence arises a sphere of Mediation (*vermittlung*), or of the notion as a system of reflective determinations, that is, of the existence passing into the internal existence of the notion, which, in this way, is not viewed as such *by itself*, but is affected by the immediate existence as by a thing properly external to itself.' This is the doctrine of the essence (*wesen*), which stands between the doctrine of existence and of the notion; but in the general division of Hegel's work it is placed under the objective logic, inasmuch as, though the essence is certainly the Internal, yet the character of the subject is expressly appropriated to the Notion.

Hegel's division therefore is into the objective and subjective, or, more distinctly, into:—

1. The Logic of Existence (Die Logik des Seyns). 2. The Logic of Essence (Die Logik des Wesens). 3. The Logic of the Notion (Die Logik des Begriffs). ('Wissenschaft der Logik,' vol. i., 1832.)

It may be useful to show in a general way what the Organon of Aristotle, as we now have it, contains. The name Organon, or Instrument, was not given by Aristotle, but is of a date posterior to him.

The following synopsis is given by Giulio Paci, in his edition of the Organon:—

Logic is conversant about the Syllogism. Accordingly the Organon explains,

1. The parts of a Syllogism.
   - With reference to primary Notions . The CATEGORIES.
   - With reference to secondary Notions On INTERPRETATION.
2. The Syllogism.
   - Generally . . . . . The PRIOR ANALYTICA.
   - Specially
     - Demonstrative . The POSTERIOR ANALYTICA.
     - Dialectic . . . The TOPICA.
     - Sophistic . . . On SOPHISTIC ELENCHI.

With this tabular view the following general description of the contents of the Organon of Aristotle, by an able writer, will be intelligible.

'The incorrect notions which have prevailed and still continue to prevail in regard to the 'nature and province of logic,' are, without detraction from his merits, mainly to be attributed to the example and authority of the philosopher himself. The book of 'Categories,' as containing an objective classification of real things, is metaphysical, not logical. The two books of 'Posterior Analytics,' as solely conversant about demonstrative or necessary matter, transcend the limits of the formal science; and the same is true of the eight books of 'Topics,' as wholly occupied with probable matter, its accidents and applications. Even the two books of the 'Prior Analytics,' in which the pure syllogism is considered, are swelled with extralogical discussions. Such, for example, is the whole doctrine of modality of syllogisms, as founded on the distinction of pure, necessary, and contingent matter; the consideration of the real truth or falsehood of propositions, and the power so irrelevantly attributed to the syllogism of inferring a true conclusion from false premises; the distinction of the enthymeme through the extra formal character of its premises, as a reasoning from signs and probabilities; the physiognomic syllogism, &c., &c. The same is true of the book on 'Interpretation' (*περὶ Ἑρμηνείας*); and matters are even worse with that on 'Fallacies' (*Sophistic Elenchi*). If Aristotle therefore did more than any other philosopher for the progress of the science, he also did more than any other to overlay it with extraneous lumber, and to impede its development under a precise and elegant form. Many of his successors had the correctest views of the object and scope of logic; and even among the schoolmen there were minds who could have purified the science from its

adventitious sediment, had they not been prevented from applying their principles to details by the implicit deference then exacted to the precept and practice of Aristotle.' ('Edinburgh Review,' April, 1833.)

It may indeed be suspected that the various treatises which compose the Organon contain interpolations. Further, what we now have are only a part of the logical works of Aristotle; and even this part does not exhibit simply a logical system, properly so called, but rather a system of argumentative discourse. [INDUCTION; SYLLOGISM.]

ORGE'RES. [EURE-ET-LOIR.]

ORGON. [BOUCHES-DU-RHÔNE.

ORIBA'SIUS an eminent physician and the intimate friend of the Emperor Julian, was born either at Sardes, the capital of Lydia, or at Pergamum, a city of Mysia, the birthplace of Galen. After having had a good education, he became a pupil of Zeno, an able physician of Cyprus. Oribasius soon became so famous in the practice of his profession as to induce Julian, upon being raised to the rank of Cæsar, to take him with him into Gaul as his physician, A.D. 355. When Julian became emperor, A.D. 361, he raised Oribasius to the rank of quæster of Constantinople. He was with the emperor in his Persian expedition, and was present when he died. He appears to have lived to a great age. There are extant three medical works attributed to Oribasius. 1, 'Medical Collections;' 2, 'A Synopsis;' 3, 'Euporista.' The first work is said to consist almost entirely of extracts from Galen. The second is said to be an abridgment of the first work; the Greek text of it has not been published. The third work, of which also the Greek text has not been published, is not very clearly described.

ORIEL. The origin of this term is very obscure, and has baffled all etymologists. It is applied to that particular kind of bay-window which is made to project from the upper story of a building. The distinction therefore between a bay and an oriel is this: by the former is understood a projecting window, or rather a projection pierced with window openings in its entire width, and rising immediately from the ground, whether it be confined to the lower part of the building or carried up through one or more stories above the ground-floor; by the latter, a bay which does not descend to the ground, but is suspended over the face of the wall beneath it. Bays generally terminate in either a plain or embattled parapet; but oriels are for the most part made to show some sort of roof, either rising behind or resting upon the mouldings which serve as their cornice. Occasionally this roof or crown is rendered an ornamental part of the design, and terminated by some kind of finish.

ORIEL COLLEGE, OXFORD, was founded by King Edward II. in 1326, for a Provost and 10 Fellows. The number of Fellows has been since increased by various benefactions. The foundation now consists of a Provost and 18 Fellows, with 24 Scholars and Exhibitioners.

No part of the present buildings of this college is of an earlier date than 1620, when the southern and western sides of the ancient quadrangle were rebuilt. The hall and chapel, which are on the eastern side of the quadrangle, were rebuilt between 1637 and 1642. About or soon after this time, the north side was re-constructed, and made uniform with the other three sides. Besides this quadrangle, on the east and west sides of the garden are two handsome buildings: that on the east was built in 1719, at the expense of Dr. Robinson, bishop of London; that on the west, called Carter's Building, was constructed in 1729, in pursuance of the will of George Carter, D.D., provost, who bequeathed his whole property to this college, partly for this purpose, and partly to purchase advowsons. In 1817 fifteen additional sets of rooms were built on the south side of Bishop Robinson's wing. Between Carter's and Robinson's Buildings stands the library, begun in 1788, from a design by Mr. James Wyatt.

The number of members, upon the college books, Jan. 1848, was 352.

ORIFLAMME. [BANNER.]

ORI'GANUM, a genus of plants belonging to the natural order *Labiatæ*. The species are herbs. *O. vulgare*, Marjoram, is a native of Great Britain in dry uncultivated places, and of Europe, north of Africa, and of middle Asia and America. It is an ornamental and aromatic plant, and yields what is sold as Oil of Thyme in the shops, a common remedy for toothache. *O. heracleoticum*, the Winter Sweet Marjoram, seldom ripens seed in this country, and is propagated by slips and cuttings. It requires a dry and sheltered situation. It is a native of the region of the Mediterranean, Greece, and about Odessa on the Black Sea. It has an aromatic sweet flavour, and is much used as a relishing herb in cookery. *O. Marjorana* of Linnæus is a tree or shrub in its native country, but an annual in our gardens. It is native of the north of Africa near Mascar, on hills, and of Asia, on the mountains of Kumaon. As the seed seldom ripens in this country, it is generally procured from France. When in blossom, the plant is cut and dried for winter use, as a savoury ingredient in cookery.

ORI'GENES, commonly called by English writers *Origen*, was born in Egypt in 184 or 185, A.D. He received instruction from Clemens of Alexandria, then a catechist at Alexandria, and at a later period he attended the lectures of the philosopher Ammonius Saccas. At the age of eighteen Demetrius, the bishop of Alexandria, put him at the head of the catechetical school in that city. Origen acquired a knowledge of Hebrew, but his acquaintance with the language was not great. He was ordained a Presbyter at Cæsarea in Palestine, in A.D. 228. He died in A.D. 253.

Origen is one of the most remarkable among the early Christian writers. He was a man of great learning and wonderful industry. His life was spent in writing, teaching, and explaining the Scriptures. No ancient critic did more towards settling the true text of the sacred writings.

The most important works of Origen were his editions of the Hebrew text and Greek versions of the Old Testament, which were the results of

a diligent collation of manuscripts. The 'Tetrapla' contained the four Greek versions of Aquila, Symmachus, the Septuagint, and Theodotion, arranged in four columns. The addition of the Hebrew text in one column, and of the same in Greek characters in another, formed the 'Hexapla.' Of this great work only a few fragments remain, the best edition of which is that by Montfaucon, in 2 vols. fol., Paris, 1713. Of his numerous other works the greater number have perished. His 'Stromata' and 'Principia' illustrated the doctrines of Christianity according to his peculiar method of interpretation. The 'Stromata' was in ten parts, and illustrated the doctrines of Christianity by comparing them with the opinions of the philosophers. Three fragments of this work are preserved by Jerome.

We have still in Greek his treatise 'Of Prayer,' his 'Exhortation to Martyrdom,' his 'Apology for the Christian Religion,' an Epistle to Africanus, another to Gregory Thaumaturgus, and fragments of a few other epistles; part of his 'Commentaries on the Books of the Old and New Testament;' 'Philocalia,' containing extracts from his works made by Gregory of Nazianzus and Basil the Great; and in the 'Catenæ' there are many notes ascribed to Origen, which Huet however considers to be spurious. Several of his works remain in Latin translations, made by Jerome and Rufinus, but chiefly by the latter. The standard edition of his whole works is that of De la Rue, in 4 vols. fol., Paris, 1733.

ORIHUELA, the ancient *Orcelis*, a city of Spain, in the kingdom of Valencia, is situated in 38° 8′ N. lat., 1° W. long., on the banks of the Segura, in an extensive plain at the foot of a lofty mountain of limestone, which overhangs it precipitously on the north. The city, which gives title to a bishop, is 7 miles from the coast of the Mediterranean, and 96 miles S.S.W. from Valencia. The population is 26,000. Besides its cathedral, Orihuela has three parish churches, two more without the walls, and five dependent churches, two hospitals, a foundling hospital, a house of refuge, a theatre, a public granary, a cavalry barrack, a post-office, and several inns. Its institutions for public instruction are a university, an ecclesiastical seminary, two colleges, and several libraries. The city is divided by the Segura into two parts, which communicate by two bridges. In form it is long and narrow, winding round the base of the mountain La-Muela, which overhangs it. The streets are straight and broad; they are not paved, but strewed with sand, which is taken from time to time to manure the land in the vicinity, and replaced by a fresh layer. The houses are for the most part regular and tolerably handsome; and the general aspect of the city is cheerful and agreeable. The inhabitants of this city have a thriving commerce, and manufactories of linen, silk, hats, soap, and starch, some tanneries, 11 flour mills, and more than 100 oil mills. The plain in which the town stands forms part of the *huerta* or plain of Murcia, and is one of the most beautiful, and most productive spots in Spain, or perhaps in the world. [VALENCIA.]

ORINOCO, a large river of South America, which has its origin on the southern declivity of the eastern part of the mountain system called Parime. It is supposed that this river rises near 64° W. long., and between 3° and 4° N. lat. Near the mission of Esmeraldas the river runs in a general western direction, and several miles farther down it divides into two arms, of which that which flows to the south-west is called Cassiquiari, and after a rapid course of nearly one hundred miles, joins the Guainia, or Rio Negro, thus forming a natural water-communication between the Orinoco and Amazon, into which latter river the Guainia falls. The Orinoco continues a wide river, and follows a tortuous course to Angostura, a little below which the delta begins, at 150 miles from the mouth of the river. The river sends off to the north a branch, which soon divides into a great number of other branches, all known by the general name of Bocas Chicas (small mouths). They are all narrow when compared with the principal branch of the river, called Boca de Navios, but most of them are deep enough to admit vessels of considerable size. The Bocas Chicas empty themselves partly into the Atlantic and partly into the Gulf of Paria, between the continent of South America and the island of Trinidad. The Boca de Navios runs eastward to the ocean, and is divided for a distance of about forty miles into two channels by a series of islands which lie nearly in the middle of the stream. From this point farther down, the breadth continues to increase, and at the mouth, between Punta Barima on the south, and the island of Cangrejos on the north, it is more than sixty miles wide.

The Orinoco contains numerous islands, cataracts, rapids, and whirlpools. The tides are perceptible to a distance of 250 miles from the mouth. In the rainy season the river overflows a vast extent of country. The whole course of the Orinoco, so far as ascertained, is estimated at 1300 miles.

The tributaries of the Orinoco are very numerous, and many of them have both a long course and a great volume of water. Those which join it on the left are navigable through nearly the whole of their course, and are rarely impeded by rapids; some of them are already navigated. But the rivers which fall into it on the right, originating on the elevated region of the Parime Mountains, descend from them by numerous rapids and cataracts, so as to be, at least for a great part of their course, entirely unfit for navigation. The chief of the tributaries from the left are—the Guaviare, 500 miles; the Rio Meta, 500; the Casanare, 300; the Rio Apure, 450; and from the right the Caroni, 300 miles.

ORIOLE (*Oriolus*), the name of a genus of birds of the family MERULIDÆ.

The Orioles are restricted to the Old World, inhabiting Europe, Asia, Africa, and the islands of the Indian Archipelago. Wooded districts are their favourite localities, and their food consists of insects, larvæ, fruits, and berries. Yellow and black are the prevailing colours of the males in adult plumage; but the females and young are tinged with greenish olive, more or less clouded.

One species only, the Golden Oriole (*Oriolus galbula*), breeds in Europe, and is an occasional visitant to our island. It is common in some parts of France, and in Italy, Greece, Egypt, &c.; but is migratory in these countries. During the breeding season this elegant bird lives in pairs, assembling in small flocks previous to migration. The nest is built with great art, generally suspended by its rim from the fork of some branch. The eggs are white, or purplish white, with dark brown or claret-coloured spots.

Golden Oriole (*Oriolus galbula*).

ORI'ON (Constellation). The Greek astro-mythological system appears to have been an application of existing fables to a subdivision of the stars derived from the East, mixed perhaps with the Oriental allegories, imperfectly understood. The trivial character of the myths by which the Great Bear and Orion, perhaps the two most remarkable constellations in the heavens, are accompanied, is enough of itself to upset any claim to high antiquity for the Greek system. We owe this brilliant cluster, according to Hyginus (of whose two or three very slight stories this is the most striking), to the fraternal solicitude of Apollo that his sister Diana should remain unmarried, or at least that she should not marry one Orion, a son of Neptune according to some. Apollo, when persuasion had failed, hit upon a method of preventing his sister's marriage, as follows. He asserted that she could not hit a black object which appeared in the sea at a distance; and she, being a good markswoman, showed him immediately that she could. This black object however was the head of her lover, who was swimming at the time; and the end of it was, that, according to custom, he was immediately gazetted as a constellation, with his club and lion's skin.

Orion is surrounded by Eridanus, Canis Major, Gemini, Auriga, and Taurus. The position of his belt, with respect to Aldebaran and Sirius, and the proximity of Procyon, Castor and Pollux, the Pleiades, &c., render it difficult to forget and unnecessary to describe this part of the heavens. Of Orion's stars, α and β, of the first magnitude, were frequently called Betelguese or Betelgeux, and Rigel, corruptions from Arabic names; γ was called Bellatrix.

ORIZONTE. The name of this artist was John Francis Von Bloemen, but the Bentvogel Society, consisting of Flemish painters resident at Rome, gave him the name of Orizonte, from the hot and vapoury air of his pictures. He was born in 1656, at Antwerp, but studied and always resided in Italy. The palaces of the pope and of the nobility at Rome possess abundance of his works, both in fresco and oil. The composition of his landscapes and the character of his trees are almost always in the style of Poussin; but the general tone is a dark green with a cast of red. He died in 1740.

ORKNEY ISLANDS, a group of islands belonging to Great Britain. They are situated north of the north-eastern extremity of Scotland, between 58° 44′ and 59° 24′ N. lat., 2° 25′ and 3° 20′ W. long. They are divided from the mainland of Great Britain by the Pentland Frith, which is 6 miles wide at its eastern entrance, and 7 miles at its western entrance. The flux and reflux of the water during the run of the tides through this strait is broken by the Pentland Skerries, which lie a little more than 4 miles to the N.E. of Duncansby Head, and 2½ miles S. of the island of South Ronaldshay; and farther westward by the islands of Swona and Stroma, the latter of which lies within 1½ mile of the shore of Caithness. A strong current is thus produced, which in gales of wind renders the strait very dangerous to deep-laden vessels. There are lighthouses erected on the Great Pentland Skerry, at the eastern entrance to the Frith, and on Dunnet Head, on the south side of the western entrance, with the assistance of which the strait may be navigated with comparative safety in moderate weather.

The group consists of 67 islands and islets, 27 of which are inhabited; the remainder, called *holmes*, are only visited during the summer for the preparation of kelp or as pasture grounds. The largest of these islands, called Pomona, or Mainland, extends from S.E. to N.W. about 18 miles, and divides the group into two portions. The islands between Pomona and the main-land of Great Britain are called the South Isles, and those north of Pomona the North Isles. Eight of the South Islands and three Skerries and fifteen of the North Isles are permanently inhabited.

The population of the Orkney Isles, in 1841, was as follows:—

Mainland, or Pomona . . .	16,141
North Isles	9,012
South Isles	5,354
	30,507

Some of the islands have rocky shores, presenting abrupt precipices, and rise in low rounded hills covered with heath, and with a considerable depth of peat-mould. Others are low and flat, with sandy shores. There are no trees on any of the islands, with the exception of a few of small size in the neighbourhood of the town of Kirkwall.

The geological character of these islands is very simple; the whole group, with the exception of a small granitic district near Stromness, consisting of rocks belonging to the old red-sandstone formation.

According to a rough estimate the surface of the Orkney Islands is 150,000 acres, of which less than one-third is cultivated and used as pasture; the remainder is a waste or covered with

water. The island of Sanda, which is flat and low, is the most fertile, and accordingly is called the granary of the Orkneys. Wart Hill, on the island of Hoy, has an elevation of 1556 feet, and is considered the highest land in the Islands. The coasts of Pomona and the South Isles are very irregular in their outline, and contain several secure and spacious harbours.

The Orkneys are exposed to the western gales from the Atlantic, which are the prevalent winds, and the climate is rather wet than cold. Frost rarely continues for several days in succession, and the harbours are open all the year round. The winter is disagreeable on account of the frequent rains, sleet, and storms, and it is usually prolonged far into the spring, which season also is very damp. The summer is generally fine, the heat being very moderate and the weather steady. The early part of the autumn is likewise agreeable, but in November the bad weather commences. The soil of some of the islands is of inferior quality, but that of others is excellent. Agriculture is limited to the raising of oats, and that kind of barley which in Scotland is called bear, or big, and to the cultivation of potatoes, turnips, and a few other vegetables. Cattle and horses are numerous but small. Many families subsist entirely on the produce of their fishing; cod, herrings, and lobsters, abound along the coast, and seals are common.

The inhabitants are of Scotch and partly of Norwegian descent. It appears that the Orkneys were early taken possession of by the Normans, and they remained subject to the kings of Norway and Denmark till the year 1468, but had their own kings or earls, who governed them as independent sovereigns. The Orkneys were the general rendezvous of the piratical fleets which so often devastated the coasts of England and France. Rollo, the conqueror of Normandy, and ancestor of William the Conqueror, was an Earl of Orkney. From the year 1471 the Earls of the island became dependent on Scotland, and from that time were considered like other chieftains of the Scottish clans.

The Orkney Islands and Shetland Islands together constitute one of the counties of Scotland, called the county of Orkney and Shetland, the area of which is 1320 square miles. The population of the county in 1841 was 61,065. The county returns one member to Parliament, and the burgh of Kirkwall is a member of the Wick District, which also returns one member.

Kirkwall, situated on a bay on the north coast of *Pomona*, is the capital of the Orkneys. The cathedral of St. Magnus at Kirkwall is one of the most remarkable specimens of middle-age architecture in Scotland; it was built by Olave, king of Denmark. It is in good repair, and still used as the parish church. Close to the cathedral are the ruins of the bishop's palace, and of the palace of Earl Patrick Stewart, the last feudal Earl of Orkney, who was executed for high treason in the reign of James I. The town consists of one long narrow street, but contains several good houses and shops. It is lighted with gas. The population in 1841 was 2205. It has a considerable trade in the produce of the island.

Stromness, situated towards the south-western extremity of Pomona, has also a good harbour. It contained in 1841 a population of 2207, and it has considerable trade.

Though there are several other good harbours, they are not used, except by fishing boats; the best in Orkney is Inganess Bay for all classes of vessels.

ORLAY, BERNARD VON, called Bernard of Brussels, was born in that city about 1490. He went to Rome, where he became a pupil of Raphael. On his return to Brussels he was employed for many years by the Emperor Charles V. He frequently painted on a ground of leaf-gold, a circumstance which is said to have preserved the freshness and lustre of his colours. He was engaged by the Prince of Nassau to paint 16 cartoons, as models for tapestry, intended for the decoration of his palace. Each cartoon contained only two figures, a knight, and a lady on horseback, representing some members of the Nassau family. These cartoons were designed in an elevated style worthy of a pupil of Raphael. They were afterwards copied in oil, by Jordaens, by the prince's order. Orlay died in 1560. There are works by him in various English collections.

ORLE'ANAIS, one of the old provinces of France, now forms the departments of LOIR-ET-CHER, LOIRET, and portions of those of EURE-ET-LOIR, and NIE'VRE. It was formerly divided into *Orléanais proper*, capital Orléans; *Gâtinais*, of which Montargis was the chief town; *Beauce*, capital Chartres; *Dunois*, chief town Château-Dun; *Vendômois* and *Blaisois*, of which the respective capitals were Vendôme and Blois; and *Sologne*, of which the chief town was Romorantin.

ORLÉANS, the capital of the French department of Loiret, is situated on the right bank of the Loire, 75 miles by railway S. by W. from Paris, 70 N.E. from Tours, in 47° 54′ 9″ N. lat., 1° 54′ 25″ E. long., and has 42,584 inhabitants. This town occupies the site of the ancient *Aurelianis*, which according to D'Anville had the earlier name of Genabum, a town plundered and burnt by Julius Cæsar ('Bell. Gall.' vii. 3-11); but some recent antiquarians contend that *Gien* occupies the site of Genabum. It was besieged by Attila in A.D. 451, but relieved by the Romans commanded by Aëtius, who defeated Attila under its walls. Orléans subsequently passed into the hands of the Franks, and became the capital of a petty kingdom. The Normans captured it in 855, and again in 865. On the accession of Hugues Capet, who had inherited the duchy of Orléans, the town became one of the most important places under the crown. It was besieged in 1428 by the English under the Duke of Bedford, but they were obliged to raise the siege with disgrace, and never after recovered their superiority. [ARC, JEANNE D'.] At this time the town gave the title of duke to a branch of the house of Valois, which afterwards came to the throne in the person of Louis XII. The town suffered much during the religious wars of the 16th century.

The town stands in a plain gently sloping down to the river: the circuit of the ramparts, which are now converted into a promenade, forms an arc of a circle about three miles in extent. The side of the town along the bank of the Loire is about a mile and a half, and the length of the principal street from the north entrance into the town to the bridge over the Loire, is about three-quarters of a mile. Orléans is surrounded by numerous country-houses, and has large suburbs, of which that of Olivet is on the south side of the river. Some parts of the town are well laid out, with wide and clean streets and well-built houses. The line of street from the Paris road to the bridge is on the whole the finest, especially that part which lies between the bridge and the Place du Martroy, in which is erected a statue of Jeanne d'Arc. But in the older parts of the town the streets are ill laid out and ill paved, and the houses are built generally of wood. The bridge over the Loire is 1089 feet long, and consists of 9 arches, of which the central one has 108 feet span. There is a handsome quay near the bridge; and between the bridge and the suburb of Olivet is a public walk. This suburb abounds with country-houses and with nursery-grounds.

The gothic cathedral of Sainte-Croix is one of the finest religious edifices in France. The present structure was commenced by Henri IV., and has been only lately finished. The architecture has excited much admiration, especially that of the portal entrance; the two towers of the front are of surpassing elegance and lightness. The church of St.-Agnan, the finest except the cathedral, is a beautiful gothic building, although now without nave or steeple. The church of St.-Pierre-le-Puellier, the oldest in the town, is remarkable only for its antiquity. Other remarkable structures in Orléans are—the church of St.-Euverte, now used as a storehouse, while the tower is turned into a shot-foundry; the chapel of St.-Jacques, now a salt-store; the old town-house, now converted into a museum and picture-gallery; the house of Agnes Sorel in the Rue du Taboury; the court-house; and the house of François I. in the Rue de Recouvrance. The town has a public library of 26,000 volumes, a theatre, and a botanic garden.

The chief manufactures are—hosiery for exportation to the Levant, refined sugar, vinegar, bleached wax, blankets, and counterpanes. To these articles of manufacture must be added cotton and woollen yarn, fine woollen cloths, flannels, hats, frles, rasps, and other tools, glue, leather, tin-ware, and earthenware. There are numerous breweries and dyehouses. Trade is carried on in the above articles, and in wine, brandy, corn, flour, wool, hides, iron, salt, hoops, dye-stuffs, saffron, fire-wood, timber, oak planks, coals, groceries, and spices. Its situation on the Loire, which is navigated by small steamers and communicates with the Seine by means of canals, and on the railway, to which the lines connecting Bourdeaux, Nantes, and the centre and south of France with Paris converge,—renders Orléans the centre of a very considerable commerce and of a large transit trade.

Orléans gives title to a bishop, whose see is the department of Loiret. It is the seat of a National Court (formerly Cour Royale), and of a University-Academy, which have jurisdiction over the departments of Indre-et-Loire, Loiret, and Loire-et-Cher. The town also possesses tribunals of first instance and of commerce, a commercial court, an exchange, a national college, a council of Prud'Hommes, a theological college, and gratuitous schools of design and architecture.

(*Dictionnaire de la France.*)

ORLEANS, PHILIPPE II., DUKE OF, born August 4, 1674, and subsequently became the celebrated Regent Orleans, of whom Voltaire has declared, that 'famed for his courage, his wit, and his pleasures, he was born for society even more than for public affairs, and was one of the most amiable men that ever existed.' The severer judgment of history has branded the memory of Philip II., duke of Orleans, with the reproach of unbounded personal and political profligacy. The principal political events of his life are given under Louis XV. A sudden death terminated his career in 1723.

ORLEANS, LOUIS PHILIPPE JOSEPH, DUKE OF, was grandson of the Regent. He was born in 1747, and known during his father's life as Duke de Chartres. He became afterwards more unhappily distinguished as the Duke of Orleans of the National Assembly, the Louis Egalité of the Convention, and was one of those who voted for the death of Louis XVI. But this did not save his life, and he was brought to the scaffold towards the close of the year 1793. He was married to Louise Marie de Bourbon-Penthièvre, daughter of the Duke de Penthièvre, grand admiral of France, by whom he left one son, Louis-Philippe, ex-king of the French, and a daughter, styled Madame Adelaide, who died Dec. 31, 1847.

ORLEANS, NEW, a city, port of entry, and the capital of the State of Louisiana, in North America, in 29° 57′ N. lat., 90° 6′ W. long., is situated on the left or N.W. bank of the Mississippi, the river here making a great bend to the N. and W. The city is 105 miles from the mouth of the river by the course of the stream, and 90 miles direct distance. The current at New Orleans is very rapid. The population in 1840 was 102,193, of whom 23,448 were slaves.

The Mississippi, opposite the city, is half a mile wide, and upwards of 100 feet deep; but at the mouth of the river there are bars with only from 14 to 16 feet of water on them. Large vessels however can enter the river, and are drawn up to the harbour by steam-tugs of enormous power. New Orleans is about 9 feet below the level of the river when the water is highest, and is protected from inundation by an embankment called the *Levee*, about 10 feet high, and generally from 20 to 40 feet wide; but in one part it is 500 or 600 feet wide. It forms a promenade, and a convenient place for depositing the cotton and other produce brought down the river. [Louisiana.]

New Orleans is built in a semicircle along the shore of the Mississippi, one set of streets following the curve of the river, and the other set run-

ning up from the river, and crossing the former at right angles. The old city, now hardly one-eighth part of the whole, was built by the French, and forms a parallelogram, bounded on three sides by wide streets planted with trees, and on the fourth by the Levee and river. Most of the houses in the old city are of wood, and only one story high. The houses in the suburbs, or Faubourgs, as they are called, are generally of brick and stuccoed. The northern Faubourg is called the American Town. The ships lie in tiers along the Levee, sometimes three or four deep, presenting the appearance of a forest of masts. Steam-boats are constantly arriving or departing. The exports exceed 12,000,000 dollars annually. The situation is exceedingly favourable for commerce, New Orleans being in fact the emporium of the great valleys of the Mississippi and its affluents the Missouri, the Ohio, the Red River, and others. [Mississippi, River.]

The Roman Catholic Cathedral is the only public building at all imposing; it has four towers, and massive walls ornamented with figures of saints in the niches. The other public buildings are—a state-house, a custom-house, 2 exchanges, a United States mint, a United States land-office, 3 theatres, 5 banks, 9 or 10 churches, the College of Orleans, another college, several academies, a charity hospital, and several other charitable institutions. Rain-water, collected in tanks, is generally used, but there are also water-works, which raise the river-water by machinery, and distribute it through pipes, which have a total length of more than 12 miles. The river-water is very dirty, but is wholesome when filtered. No city in America has so great a variety of inhabitants. The French population is probably still the most numerous, though the American is continually gaining ground. The French language is about as much spoken as the English.

During the hottest months of the year New Orleans is exceedingly unhealthy, and the greater part of the wealthier inhabitants leave it at that season; of those who remain, a large proportion are carried off yearly by yellow fever. The climate is however more fatal to Europeans who are new comers, than to natives. The sickly season extends through the months of July, August, and September. The mosquitos are in vast numbers. Every bed in every respectable house is provided with a mosquito-curtain.

Canals and railroads connect New Orleans with Lake Pontchartrain, Carrollton, and Lake Borgne.

In the environs there are large plantations of sugar, cotton, indigo, and rice, which are cultivated in a very perfect manner. There are pomegranates, magnolias, and myrtles; and the fragrance of the orange groves, when the trees are in blossom, is delicious.

New Orleans was founded by the French in 1717. In 1762 it was conveyed to the Spanish, who in 1800 reconveyed it to the French. In 1803 it was purchased by the United States, as included in Louisiana. On Jan. 8, 1815, the British, under General Sir Edward Pakenham, made an attack on the city, but they were defeated by the Americans under General Jackson.

ORMOND, the name of a large territory in the Irish county of Tipperary; and from thence was derived the title of a noble house, so ancient and illustrious, that its origin has been ascribed to the ducal blood of Normandy, before the conquest of England.

ORMOND, JAMES BUTLER, DUKE OF, was born in London in 1610. His grandfather, Walter, earl of Ormond, who had succeeded to the title collaterally, was exposed to the tyranny of James I., and imprisoned for several years, because he refused to submit to an unjust award of that king in behalf of one of his Scottish favourites. When Earl Walter was thrown into prison, his grandson and heir, young James, then styled Viscount Thurles, was seized in wardship by the crown, and committed to the tutelage of Archbishop Abbot, who is said to have neglected the general education of his charge, but caused him to be well instructed in the Protestant faith. On the death of James I., Earl Walter recovered his own liberty and the guardianship of his heir. The young Lord Thurles began to figure at court, and married his kinswoman, Lady Elizabeth Preston. In 1632, Lord Thurles succeeded, on his grandfather's death, to the earldom of Ormond.

On the breaking out of the Irish Rebellion of 1640, Ormond was appointed by the lords-justices to the command of the royal troops. With very inadequate forces, he repeatedly defeated the rebels, near Dublin, at Drogheda, at Kilrush, and at Ross; but notwithstanding these services, in the course of which he was thanked by the Long Parliament, and raised to the dignity of Marquis by the king, he was so ill supported on all sides, that he was compelled, in 1643, to conclude a treaty for a cessation of arms.

Throughout the next four years, during which the civil war was raging in England, Ormond, who had been invested by Charles I. with the nominal dignity of lord-lieutenant of Ireland, contrived to hold that kingdom for his master. But when Charles had fallen into the hands of his enemies, his position against the Roman Catholics became completely untenable. He therefore resigned his authority into the hands of parliamentary commissioners, and joined the king, then a prisoner at Hampton Court. Thence he retired to France; but still directing his attention to Ireland, and receiving encouragement from the Roman Catholics, he again landed in that kingdom, and endeavoured to restore the royal authority. Notwithstanding every effort however, he was defeated by Colonel Jones near Dublin; and Cromwell himself soon after landing in Ireland with an overwhelming force, Ormond was obliged, at the end of the year 1650, to evacuate the island and withdraw to France. From this time until the death of Cromwell, Ormond was actively and variously employed in many important missions for his exiled king, Charles II.; and, on the Restoration, he accompanied Charles to England, and was rewarded for his sufferings and services by the ducal title and other honours. The remainder of the life of the Duke of Ormond was passed, though not without some troubles and reverses, in the enjoyment of a high rank and

spotless reputation. These could not always protect him from the royal caprice and the machinations of court intriguers; and during the reigns of Charles II. and James II., he was twice again possessed and deprived of the government of Ireland, which he administered for many years with activity, wisdom, and justice. He died, full of years and honour, in 1688.

ORMSKIRK. [LANCASHIRE]

ORMUS. [ARABIA.]

ORNANS. [DOUBS.]

ORNE, a department in France formed out of the old duchy of Alençon, the northern part of Perche, and a portion of the south of Normandie, is bounded N. by the department of Calvados, E. by those of Eure and Eure-et-Loir, S. by those of Sarthe and Mayenne, and W. by that of Manche. Its greatest length from E. to W. is 84 miles; the average width is 28 miles. It lies between 48° 12′ and 48° 58′ N. lat., 1° 0′ E., and 0° 47′ W. long. The area is 2357.4 square miles, and the population in 1846 was 442,107, being 187.54 to the square mile, or 13.79 above the average per square mile for the whole of France.

The department is traversed from E. to W. by a range of wooded hills which forms part of the watershed between the English Channel and the Loire. The highest points in this chain do not exceed 1368 feet. The larger portion of the department lies to the north of this range, from which numerous lateral chains spring off in a general north or north-western direction, inclosing between them fertile and well-watered valleys. A small portion of the department, drained by the Iton and the Rille [EURE], slopes towards the north-east. The other more important rivers to the north of the principal range are—the Touque, the Dive [CALVADOS], the Aure [EURE], and the Orne, which gives name to the department. The *Orne* rises near Séez, and runs through the department past Argentan in a north-west direction, till it enters Calvados, where it turns N. by E., passing Caen; here it becomes navigable, and enters the English Channel about 10 miles below this town, after a course of about 70 miles. Its principal feeders are the Noireau, the Aize, and the Odon. That portion of the department which belongs to the basin of the Loire is drained by the MAYENNE and the SARTHE; this last-named river rises near Séez, and runs for some way along the southern boundary. There are a great number of ponds and several mineral springs, of which that at *Bagnoles*, 10 miles from Domfront, is famous for the cure of skin diseases and of rheumatism. The department is crossed by 8 national and 14 departmental roads, and by the railway, now in course of construction, from Le-Mans to Caen, which passes through Alençon, Séez, and Argentan, and is joined at Séez by a branch line from Chartres.

The climate is in general temperate, but damp. The spring brings cold east winds, white frosts, and rain; the summer is dry and warm, but terminates with storms in September; in autumn the rains begin to fall about the middle of October, then succeed white frosts till the end of November; in the depth of winter there are continual fogs with much rain and snow. The chief grain crops are wheat, mixed corn, rye, and oats, of which in ordinary years the produce suffices only for about two-thirds of the consumption. No wine is produced; cider is the chief beverage. The number of apple and pear trees, which are planted along the roads, round the fields, or in quincunxes, amounts to several millions. In good years the quantity of cyder made amounts to 59,400,000 gallons. The pasture land of the department is of considerable breadth, and in general of good quality; great numbers of lean cattle, purchased in the neighbouring departments, are fattened for the Paris and Rouen markets; good butter and middling cheese are made. The plain of Alençon is famous for its saddle horses of the purest Norman breed; in the rest of the department a large number of cart horses, also of the Norman breed, are reared. Poultry of all kinds, especially geese, are abundant.

Several iron mines are worked; marble, granite, porphyry, building-stone, marl, kaolin, porcelain clay, and quartz crystals are found; these last, after being carefully cut, get the name of Alençon diamonds. The number of smelting furnaces and forges at the several iron works amounts to 49.

Besides pig and bar iron, the industrial products include sheet iron and copper, wire of different kinds, pins and needles, linen, canvass, lace, thread, hair-cloth, cotton and woollen yarn, glass, paper, beet-root sugar, pottery, and leather. There are several large bleach works in the department. Other articles of commerce are—corn, clover-seed, cyder, flax, thread, linen, wax, honey, horses, fat cattle, pigs, poultry, goose feathers, oak staves, timber, and firewood. About 200 fairs are held in the year. As many as 8000 workmen emigrate annually to Paris, and the neighbouring departments, when work is slack at home. There are 827 wind and water-mills, and 313 workshops of different kinds in the department.

The department contains 1,508,783 acres, distributed among 150,582 proprietors, and into 1,157,984 parcels. Of this area 823,879 acres are under cultivation; 323,831 consist of pasture and meadow land; 237,155 acres are covered with woods and forests; 27,481 acres are laid out in orchards, nurseries, and gardens; 45,106 acres consist of heaths and moors; and 34,373 acres are occupied by streets, roads, squares, &c.

The department is divided into 4 arrondissements, which with their subdivisions and population are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Alençon . .	6	108	72,801
Argentan . .	11	248	110,111
Domfront . .	8	70	135,309
Mortagne . .	11	171	123,886
Total. . .	36	597	442,107

Of the arrondissement of Alençon and of the whole department the capital is *Alençon*, a large well-built town surrounded by 5 suburbs,

and situated 108 miles W. by S. from Paris, in an extensive and fertile plain at the confluence of the Briante with the Sarthe. The streets are wide, well paved, clean, and pretty regular. In the principal square, which communicates with a magnificent walk shaded by fine trees, stand the town-hall and the court-house. The other remarkable structures are the cathedral of Notre-Dame; the church of St.-Léonard, the college church, in the upper part of which the public library of 8000 volumes is kept; the hospital; the corn-market; and the church of Montsort, said to be a structure of the 8th century. The town has tribunals of first instance and of commerce, a council of Prud' Hommes, a chamber of commerce, a college, and 13,927 inhabitants. It is the centre of a considerable linen trade; and has a cotton-thread factory, a linen factory with 3000 spindles, 3 steam factories for mousselines de laine, cotton and other stuffs; tan-yards; breweries; distilleries, &c. Embroidery, glove-making, and lace-making, give employment to numerous hands. There is a considerable commerce in Alençon in the articles named, and in cider and perry, the produce of the surrounding country. *Carrouges*, 16 miles N.W. from Alençon, has smelting furnaces and forges for manufacturing the iron ore raised from the mines in the neighbourhood; a fine feudal castle, of the 14th century, still inhabited; and 2145 inhabitants. *Séez*, 13 miles N. by E. from Alençon, is a well built episcopal town on the Orne, with one of the finest Gothic cathedrals in Lower Normandie, a handsome episcopal palace, a college, two ecclesiastical seminaries, and 4474 inhabitants.

In the arrondissement of Domfront, the chief town *Domfront*, situated 30 miles W. by N. from Alençon, has a tribunal of first instance, a college, and 2463 inhabitants. The town, built on a steep rock above the Varennes, a feeder of the Mayenne, is ill built, with narrow, crooked and steep streets. The ancient church of Notre-Dame is the only important structure. In the neighbourhood there are iron forges, glass works, and paper mills. *Athis*, 15 miles N. from Domfront, has 4000 inhabitants, who manufacture broad cloth, casimirs, and other woollen stuffs. *La-Ferté-Macé*, E. of Domfront, has manufactures of cotton, tape, twist, combs, tobacco-boxes, brandy, leather, and tiles. The population of the commune is 5197. *Flers*, N. of Domfront on the road to Caen, is the centre of a large linen manufacture, and has 6113 inhabitants. The old castle of Flers, which was burned during the Chouan war, has been lately restored. *Passais*, S.W. from Dromfront, has a population of 2163. *Tinchebrai*, in the north-west of the department near the source of the Noireau, has a commercial court and 3783 inhabitants, who manufacture nails, hardware, ironmongery, cotton and woollen stuffs, paper and leather. Robert Duke of Normandy was defeated and taken prisoner in a great battle before Tinchebrai, Sept. 27, 1105, by his brother Henry I. of England.

In the arrondissement of Argentan, the chief town *Argentan*, situated on a hill above the Orne, 22 miles N. from Alençon, is a clean well-built town, surrounded by old ramparts that form a pleasant walk, and afford a fine view of the valley of the Orne. It has tribunals of first instance and of commerce, a college, and 5611 inhabitants; also linen factories, bleach works, and tan-yards, besides some trade in corn, hides, cattle, poultry, and cheese. The old castle, now converted into a prison, the churches of St.-Germain and St.-Martin, are the most remarkable buildings. *Vimoutier*, 17 miles N.E. from Argentan, is the centre of an important linen manufacture, and has large bleach works, tan-yards, a tribunal of commerce, and 4110 inhabitants. The places that give name to the other cantons are mere villages.

The arrondissement of Mortagne is named from its chief town *Mortagne*, which is situated on the sides and summit of a high hill, 20 miles E. by N. from Alençon, and has a tribunal of first instance, a college, and 5012 inhabitants. Some of the streets are steep; but most of them are wide, and the houses well built. The high road from Paris to Brest winds round the hill and up to its very summit, where it traverses the Place-d'Armes, the principal square of the town. The court-house, the large prison, the markets, and the fountains, which are fed with water raised from a great depth by a steam-engine, are the most note-worthy objects in the town. Here also linen is the staple manufacture; pottery and leather are also manufactured; and there is some trade in corn, hemp, sheep, pigs, horses, and cattle. *Bellême* is a well-built town, situated 11 miles S. from Mortagne, on a hill near the forest of Bellême, and has 3143 inhabitants. It was formerly one of the chief towns of Perche, and had strong fortifications, some of which remain. Calico, cotton yarn, linen, canvass, and paper, are the chief industrial products. *L'Aigle*, prettily situated on the slopes of two hills, 17 miles N. from Mortagne, is a well-built, clean, and improving town, with a commercial court, a consultative chamber of manufactures, and 5505 inhabitants. The town is traversed by the Rille, and still preserves some remains of its inclosing walls and ditches. The castle, situated in the centre of the town, is a large brick building, more remarkable for the beautiful gardens and the magnificent lime-trees that surround it than for its architecture. The churches of St.-Martin, St.-Barthélémy, and St.-Jean, and the town-hall, are among the chief buildings of the town. The largest pin-factory in France is in this town, which has also important manufactures of nails, needles, card-wire, ribands, woollen yarn, leather, and hardware. In the neighbourhood there are several copper, tin, and iron foundries. *Longni*, E. of Mortagne, has tan-yards, iron-smelting furnaces and foundries, and 2946 inhabitants. *Tourouvre*, 7 miles N.E. from Mortagne, has glass works, iron forges, and 2000 inhabitants.

The department forms the see of the bishop of Séez; is included in the jurisdiction of the High Court, and in the circuit of the University-Academy, of Caen; and belongs to the 14th Military Division of which Rouen is head-quarters. Under the monarchy it returned 7 members to the Chamber of Deputies; it now has 9 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

ORNITHOGALUM, a genus of plants belonging to the natural order *Liliaceæ* and the tribe *Asphodeleæ*. The flowers are white or yellow, never blue. *O. umbellatum*, Common Star of Bethlehem, is found in meadows and pastures in Great Britain. *O. pyrenaicum*, Spiked Star of Bethlehem, has flowers of a greenish white. The leaves wither before the stalk appears; they are rarely contemporaneous. It is extremely common near Bath, and in Sussex and Bedfordshire. *O. nutans* is occasionally found in fields and orchards in Great Britain. *O. maritimum*, Squill, is described under SCILLA and SQUILLA.

ORNITHOLOGY, the science which teaches the natural history and arrangement of birds. The term is derived from the Greek words ὄρνις, 'ornis,' a bird, and λόγος, 'logos,' a discourse; signifying literally 'a discourse upon birds.' [BIRDS.]

ORNITHOPUS, is a genus of small papilionaceous annual plants, found in pastures and wild places in Europe. The species found in this country is a plant from two to six inches high; but in Portugal occurs the *O. sativus*, an annual growing as much as two or three feet high, with stems as succulent and nutritious as those of vetches or lucerne, and cultivated in that country as food for cattle.

ORNITHORHYNCHUS, Blumenbach's name for that extraordinary quadrupedal form, the *Duckbill* or *Duckbilled Platypus*, *Platypus anatinus* of Shaw; *Water-Mole* of the English colonists.

It is hardly to be wondered at that when this animal was first sent from New Holland to this country, it was received by zoologists with caution amounting to suspicion. The singular beak, which occupied the usual place of the mouth, startled the observer when it appeared as the organ of a hairy quadruped; nor was it till one or two more specimens arrived (from Governor Hunter, we believe, and addressed to Sir Joseph Banks) that naturalists were ready to allow that this beak was naturally attached to the body.

Upon a form so anormal conjecture was busy, more especially as to that part of its organization relating to reproduction. Was it oviparous or viviparous? Did it suckle its young? These were questions constantly asked, and answered as such questions generally will be, in the absence of personal examination, with considerable tact and learning by the supporters of the different theories, but with no satisfactory result. Evidence however gradually came in, and fortunately fell into the hands of those capable of using it; and we now know, principally by the enlightened labours of Professor Owen, that the Ornithorhynchus is an ovoviviparous animal, that it suckles its young, and that its proper place is among the *Monotremata*, or Monotremes, a group to which no animal hitherto discovered belongs, excepting that which forms the subject of this article and *Echidna*. [ECHIDNA.]

Generic Characters.—'Body depressed, nearly oval, and clothed with a dense fur; head with the facial portion elongated, and forming a broad and depressed beak-like snout, covered by a naked skin, which is produced into a lappet-like fold at the base of the snout; eye small; upper and under jaws furnished on each side and towards the front with a long narrow horny appendage, and towards the hinder, with a broad nearly ovate crushing tooth, of the same horny substance; tongue short, and provided in parts with horny papillæ; legs short; the feet fitted for swimming; each foot with five well-developed toes, between which a membrane is extended; on the fore-foot the membrane is produced considerably beyond the toes; claws of the fore-feet large, solid, and depressed, and fitted for burrowing; tail rather short, broad, and depressed; stomach with the cardiac and pyloric orifices closely approximated; cæcum small. The male sex provided with a spur to hind foot.'—Waterhouse.

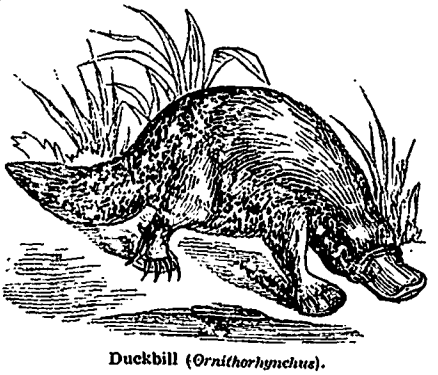
Cheek-pouches; insectivorous; aquatic; inhabits deep burrows in the banks of ponds or rivers. One species only is decidedly known, though some naturalists consider that two species are discriminated. (Ogilby in 'Proc. Zool. Soc.,' 1831, and Macgillivray in 'Mem. of Wernerian Soc.,' 1832.)

Locality, New South Wales and Van Diemen's Land.

The mystery in which the true nature of the Ornithorhynchus was formerly enshrouded is now dispelled. Geoffroy St. Hilaire, Cuvier, Meckel, Professor Von Baer, and others, have thrown more or less light upon the anomalies in the organization of this singular quadruped. It was not however until Professor Owen took up the subject, under peculiarly advantageous circumstances, that the full light of truth became manifest, the ovoviviparous nature of the animal proved, and the character of the mammary glands of the female demonstrated. Of the papers of Professor Owen we may notice the following. First, 'On the Mammary Glands of the *Ornithorhynchus paradoxus*,' read before the Royal Society (21st June, 1832), and published in 'Phil. Trans.' for 1832, Part 2; secondly, 'On the Ova of the *Ornithorhynchus paradoxus*,' read before the same Society on the 19th of June, 1834, and published in 'Phil. Trans.' for 1834, Part 2; thirdly, 'On the Young of the *Ornithorhynchus paradoxus*,' communicated to the Zoological Society of London, on the 27th May, 1834, and published in the first volume of the 'Transactions' of that Society.

With respect to the habits and manners of the Ornithorhynchus, we select Mr. G. Bennett's account (with some abbreviation), published in the 'Trans. Zool. Soc.,' vol. 1, of a specimen which he kept secured by a cord fastened to the hind leg. 'It was exceedingly lively, swam in the centre of the stream, and appeared in excellent health and spirits. The water at one part of the river being very clear, I saw its motions distinctly under the water. On diving, it sank speedily to the bottom, swam there for a short distance, and then rose again to the surface; it ranged the banks, guiding itself in its progress according to the impressions received by the mandibles, which appeared to me to be used by it as

very delicate organs of touch. It seemed to feed well; for whenever it inserted its beak into the mud, it evidently procured some food from thence, as, on raising the head, after withdrawing the beak, the mandibles were seen in lateral motion, as is usual when the animal masticates. Although several insects were basking and fluttering about the surface of the water, close to it, no attempt was made to capture them, either from its not seeing them, or from its preferring the food which the mud afforded. The motions of the mandibles in this animal, when seeking its food in the mud and water, are the same as those of a duck when feeding in similar situations. After feeding, it would lie sometimes on the grassy bank, and at others partly in and partly out of the water, combing and cleaning its coat as usual with the claws of the hind feet.



Duckbill (*Ornithorhynchus*).

'After permitting it to swim, feed, and clean itself for an hour, it was replaced, although with great reluctance on its own part, in its box: it did not however, as before, betake itself to repose, but commenced and continued a scratching on the sides of the box.' The same author states that these animals feed on the minute *Testacea* which may be found about the water-plants and in rivers. On examining the cheek-pouches or the stomachs of these animals, he always observed the food to consist of river insects, very small shell-fish, &c., which were constantly found comminuted and mingled with mud or gravel, probably to aid digestion. River weeds have also been found in their pouches, and the natives say they feed on them also. We owe to Mr. G. Bennett, who has contributed so much to our knowledge of the natural history of this and other scarce animals, a description of the burrows of these extraordinary creatures. They were traced up a bank of a river, where, amongst some long grass, the entrance of a burrow was discovered, and the internal construction of it was laid open by digging. The entrance was large, particularly when compared with the width of the passage continued from it, measuring one foot three inches in depth, and one foot one inch in breadth. As it receded from the entrance, the burrow became narrower, being about the usual breadth of the animal when uncontracted. 'After having traced it,' continues Mr. Bennett, 'for the distance of ten feet four inches, and having just delved down upon it so as to perceive it still continuing its course up the bank, the beak and head of a Water Mole were seen protruding for an instant from the upper part, as if it had been disturbed from its repose, and had come down to see what we were about with its habitation. It only remained for an instant; for as soon as it beheld us, it immediately turned up to take refuge in that part of the burrow which yet remained unexplored. In turning round however it was seized by the hind leg and dragged out. The animal appeared very much alarmed when it was hauled out of its subterraneous dwelling: it discharged its urine (which had rather a strong odour) and its fæces, when first caught, which I attributed to fear, for this is not usual with other living specimens that I have since seen. It uttered no sound, nor did it attempt to bite; and proved to be a full-grown female. When I held the unfortunate Platypus in my hands, its bright little eyes glistened, and the orifices of the ears were expanded and contracted alternately, as if eager to catch the slightest sound, while its heart palpitated violently with fear and anxiety. * * This animal uttered, when disturbed from its sleep, a noise something like the growl of a puppy, but perhaps in a softer and more harmonious key. Although quiet for the greatest part of the day, it made efforts to escape, and uttered a growling noise during the night.' But we must return to the burrow, the distance of the entrance of which from the water's edge was five feet. It ran up the bank in a serpentine course, approaching near to the surface of the earth towards its termination, at which part the nest, composed of dried grass, and weeds strewed over the floor, is situated; but none had been as yet made in this burrow. Mr. Bennett found the whole extent of the burrow, from the entrance to the termination, to be 20 feet by actual measurement. He observes, that the burrows are situated above the usual river height, but do not appear to be above the extensive floods of the river, which frequently take place during the winter season.

ORNUS. [FRAXINUS.]

OROBANCHA'CEÆ are a natural order of monopetalous exogenous plants, growing parasitically upon the roots of other species, and, as is very usual in such cases, producing no true leaves, but furnished with brown or reddish scales in their place. In this country the order is represented by the genus *Orobanche* itself, the various species of which, called Broom-Rapes, are found in fields, upon the roots of broom, furze, hemp, clover, bed-straw, &c.

OROBANCHE, a genus of plants, the type of the natural order *Orobanchaceæ*. *O. major*, Greater Broom-Rape, is a native of Europe, growing parasitic upon broom, furze, and other shrubby leguminous plants, on a barren and dry soil. It is abundant in some parts of Great Britain. This plant is very bitter and is a powerful astringent. *O. minor*, Lesser Broom-Rape, is found in Europe parasitical upon the roots of the *Trifolium pratense*. Although it is sometimes very abundant, it does not appear to injure the

crop of clover. It is constantly found in many parts of England with the clover crops.

Two other British species, *O. cærulea* and *O. ramosa* are described by Babington. These are referred by many systematists to the genus *Phelipæa*, which is distinguished from *Orobanche*.

ORODES. [CRASSUS.]

ORO'SIUS, PAULUS, a presbyter of the Spanish church, was born in the latter part of the fourth century, in Spain. He wrote a 'History of the World,' which ends A.D. 416. This work may be considered as a kind of Apology or Defence of Christianity against the Pagans. He interweaves with his narration moral reflections, and sometimes whole chapters of advice and consolation to the Christians, intended to confirm their faith in the midst of the calamities of the times. His tone is that of a Christian moralist, impressed with the notions of justice, retribution, and humanity. He deprecates ambition, conquest, and glory, gained at the expense of human blood and human happiness. As an historian, Orosius shows considerable critical judgment in general, though in particular passages he appears credulous, as in chap. x. of the first book, where he relates from report that the marks of the chariot wheels of Pharaoh's host are still visible at the bottom of the Red Sea. As an instance of the incidental value of the passages taken by Orosius from older writers, see Savigny, 'Das Recht des Besitzes,' p. 176.

King Alfred made a free translation of the History of Orosius into the Anglo-Saxon language, which was published by Daines Barrington, with an English version of it, 8vo., London, 1773. One of the best editions of Orosius is that of Leyden, 4to., 1738, with Haverkamp's notes.

ORPHEUS, a poet, musician, and philosopher, whose name is prominent in the early legends of Greece. According to the legend, he was a native of Thrace, and the son of Apollo and of the muse Calliope. He was one of the Argonauts, to whom he rendered great services by his musical skill. His wife was Eurydice, who died from the bite of a serpent. According to one account, Orpheus himself was torn in pieces by the women of Thrace for his excessive sorrow for the death of his wife. The poets and fabulists attribute to Orpheus many improvements in the condition of the human race. He is said to have founded the religion of Greece, and the mysteries. The chief legends concerning Orpheus are those which relate to his musical skill, by which he tamed wild beasts, and caused even inanimate things to move.

ORPHICA, certain works ascribed to Orpheus, which embodied the opinions of a class of persons whom Müller thus describes:—'These were the followers of Orpheus (οἱ Ὀρφικοί); that is to say, associations of persons who, under the guidance of the ancient mystical poet Orpheus, dedicated themselves to the worship of Bacchus, in which they hoped to find satisfaction for an ardent longing after the soothing and elevating influences of religion. The Dionysus, to whose worship these Orphic and Bacchic rites (τὰ Ὀρφικὰ καλούμενα καὶ Βακχικά, Herod., ii. 81) were annexed, was the Chthonian deity Dionysus Zagreus, closely connected with Deméter and Cora, who was the personified expression, not only of the most rapturous pleasure, but also of a deep sorrow for the miseries of human life. The Orphic legends and poems related in great part to this Dionysus, who was combined, as an infernal deity, with Hades (a doctrine given by the philosopher Heraclitus as the opinion of a particular sect); and upon whom the Orphic theologers founded their hopes of the purification and ultimate immortality of the soul. But their mode of celebrating this worship was very different from the popular rites of Bacchus. The Orphic worshippers of Bacchus did not indulge in unrestrained pleasure and frantic enthusiasm, but rather aimed at an ascetic purity of life and manners. The followers of Orpheus, when they had tasted the mystic sacrificial feast of raw flesh torn from the ox of Dionysus (ὠμοφαγία), partook of no other animal food. They wore white linen garments, like Oriental and Egyptian priests, from whom, as Herodotus remarks, much may have been borrowed in the ritual of the Orphic worship.' ('History of the Literature of Greece,' in the *Library of Useful Knowledge*, p. 231, &c., where the reader will find a full account of the Orphic theology.)

ORPIMENT. [ARSENIC.]

ORRERY. This name has been applied to four different kinds of machines for representing the phenomena of the solar system. A Planetarium exhibits the orbital motion of the planets about the sun; a Tellurian and Lunarian, when combined, exhibit, respectively, the motion of the earth about the sun and of the moon about the earth; and a Satellite Machine exhibits the motion of Jupiter's satellites about their primary.

Planetary Machines were in use at a very remote period, and appear to have consisted for many centuries of movable spheres having the earth in their centre. Thus we read of the Chinese spheres said to have been made some 2000 years before the Christian æra, and subsequently of the spheres of Archimedes and Posidonius. (Cicero, 'De Nat. Deor.,' lib. ii., cap. 34, 35.)

In the latter part of the 17th century Huyghens and Roemer employed themselves in the construction of Planetary Machines in conformity with the Copernican doctrine. Roemer also invented a Satellite Machine prior to the year 1679; and both his machines are described in his 'Basis Astronomiæ,' printed in 1735.

In England, about the year 1700, Mr. George Graham constructed a machine which exhibited the motion of the earth about the sun, while the moon revolved about the earth. One of these machines was made for the Earl of Orrery, from which circumstance the term Orrery originated. A large Planetarium was, in 1801, made for the Royal Institution of London, and a more complete instrument was constructed by Dr. Pearson in 1813.

To produce the revolution of the planetary balls about the sun, a system of vertical concentric tubes is usually employed, which are adjusted very near to each other, but yet so far removed as not to influence each other's motion. These tubes are of different lengths, the innermost being the longest, and to the superior extremity of each

a radius vector is attached, and thereby made to revolve once during each revolution of the tube. The lower extremities of the tubes form the arbors or axes of as many toothed-wheels, which are either immediately driven by pinions adjusted to a vertical axle called the 'annual arbor,' or derive their motions indirectly from those pinions by means of an interposed train of wheels. The determination of the relative number of teeth which must be given to the wheels and pinions in order to produce the required motion, may be thus explained:—

Supposing we wish the radius which carries the ball representing the earth to revolve once during each revolution of the annual arbor, it is only necessary that the wheel which is adjusted to the lower extremity of the earth's tube should contain the same number of teeth as the pinion by which it is driven, and which is adjusted to the annual arbor. In this case each revolution of the annual arbor will be the measure of one solar year. For the sake of simplicity let it be assumed that the earth's radius vector revolves exactly once during each revolution of the annual arbor; upon this supposition we have to fix the relative number of teeth which should be given to the wheels and pinions which regulate the motions of the other planetary balls. If it were required, for example, to represent the relative orbital motions of Jupiter and the Earth; there must be obtained the fractional part of one revolution of Jupiter which takes place during one revolution of the Earth. This fraction is $\frac{365.2564}{4332.5348}$, the numerator and denominator expressing, respectively, the mean solar days in the revolutions of the Earth and Jupiter about the sun. A near approximation to this fraction is expressed by $\frac{7}{83}$; therefore if the wheel attached to Jupiter's tube contain 83 teeth, and the pinion attached to the annual arbor by which it is driven contain 7 teeth, then Jupiter's radius will revolve once during $11\frac{6}{7}$ revolutions of the annual arbor. This number, being multiplied by 365.2564 days, gives 4330.897 days for the time in which Jupiter's revolution is performed; and this is less than the true period by 1.688 days only.

The contrivance by means of which a true elliptic orbit may be produced, is extremely simple. For this purpose all that is necessary is that the radius vector which connects the planetary ball with the superior extremity of the tube should consist of two parts or arms, the lengths of which have a determinate ratio dependent solely upon the eccentricity of the orbit, and that while the larger arm revolves about the *centre* of the ellipse by means of the wheel-work already described, the smaller arm be made to revolve about the extremity of the larger with the same angular velocity but in the opposite direction.

Notwithstanding the ingenuity displayed in these contrivances, it must be observed that the most complete mechanical representation of the solar system that has yet been invented is far inferior to that which a student may form in his own mind from an attentive perusal of a good popular treatise on the subject.

ORRERY, EARL OF. [BOYLE, CHARLES.]

ORRIS ROOT. [IRIS.]

ORSI'NI, FULVIO, said to have been an illegitimate member of the noble family of that name, was born at Rome about 1530, and became canon of St. John of Lateran. He was well versed in classical literature, both Greek and Roman, and collected a valuable library of MSS., which he bequeathed to the Vatican Library. He was intimate with the cardinals Alexander and Edward Farnese, and was considered one of the first scholars of his age. He died at Rome, about the year 1600. He wrote several learned works, the principal of which is 'Familiæ Romanæ quæ reperiuntur in Antiquis Numismatibus, ab Urbe Conditâ ad tempora Divi Augusti, cum adjunctis Antonii Augustini Episcopi Ilerdensis,' fol., Paris, 1663.

ORTE'LIUS, ABRAHAM, born at Antwerp in 1527, of a family originally from Augsburg, studied philology and mathematics, and became the first geographer of his age. His great work is 'Theatrum Orbis Terræ,' being a description of the globe, or universal geography.

ORTHEZ, a town in the French department of Basses-Pyrénées, 25 miles N.W. from Pau, and 37 E. from Bayonne, is pleasantly situated on the right bank of the Gave-de-Pau, and has a tribunal of first instance, a college, and 7021 inhabitants. There is a suburb on the left bank, which communicates with the town by an ancient Gothic bridge. On the only pier of this bridge is a tower. The streets of the town are well laid out, and the houses well built. There are, on a height commanding the town, some ruins of the ancient castle of Moncade, in which Gaston Phœbus, Count of Foix, lived and died. The town has manufactures of woollen stuffs, linen, yarn, leather, linseed oil, &c. There are also dyehouses, copper foundries, and saw mills. The commerce in hides, hams, wool, goose feathers, flax, timber, slates, cattle, and marble is considerable. The French under Marshal Soult were defeated after an obstinate battle, by the allied army, commanded by the Duke of Wellington, near this town, Feb. 27, 1814.

ORTHOGONAL, ORTHOGRAPHIC. The first of these terms, when not used in the same sense as the second, means simply perpendicular. Thus a curve cuts a set of curves orthogonally when it cuts them all at right angles.

Orthogonal or othographic projection is that which is made by drawing lines from every point to be projected, perpendicular to a plane of projection. Thus if a plane were horizontal, and a point were to drop from a given position upon the plane, its last position would be the orthogonal or orthographic projection of its first.

ORTHO'PTERA, one of the orders into which insects are divided. Of this order the Common Cockroach (*Blatta*), the House-Cricket, and the Grasshopper are familiar examples.

Latreille divides the order *Orthoptera* into two sections, to which he applies the names *Cursoria*

and *Saltatoria*, or runners and jumpers. In the Cursoria all the legs are usually alike and fitted for running, and they are thus easily distinguished from the Saltatoria, in which the hinder legs are long and the thighs thick. The males of the species belonging to the second section have the power of producing a shrill noise, but this is not always effected in the same manner.

To the section *Cursoria* belong the families *Forficulidæ* (or Earwigs), the *Blattidæ* (Cockroaches), the *Mantidæ* (or Mantis tribe), and the *Phasmidæ*. The section *Saltatoria* may be divided into three families—the *Gryllidæ* (of which the common House-Cricket affords an example), the *Locustidæ* (Locusts), and the *Acridiidæ* (or Grasshoppers).

ORTOLAN, the French and English name for a species of Finch (*Fringillidæ*) much esteemed by epicures for the delicacy of its flesh when in season. It is the *Hortulanus* of Gesner and others, *Miliaria pinguescens* of Frisch, *Emberiza hortulana* of Linnæus, *Ortolano* of the Italians, and *Garten Ammer* and *Fettammer* of the Germans. Montague terms it the Green-Headed Bunting.

Ortolan (*Emberiza hortulana*)

The south of Europe may be considered the summer and autumnal head-quarters of the Ortolan, though it is a summer visitor in the central and northern parts. In Italy it is said by Temminck and others to be common. The Prince of Musignano states that it is found in the Sabine Mountains, but not commonly, in the summer, and that it rarely occurs in the plain of Rome, but that it is frequent in Tuscany. Lapland, Russia, Denmark, Sweden, and Norway, are among the countries visited by it. In England it seems to be only entitled to rank as an accidental visitor, but it is by no means clear that it does not occur more frequently than is generally supposed; for, especially to an unpractised eye, it might be mistaken for the Yellow-Hammer, and in some states of its plumage for other Buntings. It has been taken in the neighbourhood of London, and also in Yorkshire. In Southern Europe it is common from May to August, and every spring and autumn may be observed at Gibraltar on its migration. Mr. Strickland saw it at Smyrna in April. North Africa is its winter residence. Colonel Sykes notes it in his 'Catalogue of the Birds of Dukhun' (Deccan).

ORUS, or HORUS, an Egyptian deity, the son of Isis and Osiris, corresponds, according to Herodotus, to the Apollo of the Greeks, and was the last of the gods who reigned in Egypt. (Herod. ii. 144.) [HORAPOLLO.]

ORVIE'TO, the chief town of the Delegazione of Orvieto, and the residence of a cardinal bishop, in the Papal States, is built on a steep hill, which rises above the river Paglia, an affluent of the Tiber, about 16 miles N.E. from Bolsena, and has 8000 inhabitants. It is chiefly remarkable for its handsome Gothic cathedral, begun about the end of the 13th century, and finished towards the middle of the 14th century. The façade, one of the finest in Italy, is ornamented with sculptures and mosaics. The interior contains a very large collection of the sculptures of the 16th century, and is enriched by many beautiful paintings, and other works of art. The other remarkable buildings of Orvieto are the town-house and the Jesuits' college, and St. Patrick's well (Pozzo di San Patrizio), excavated in the tufa rock on which the town is built. The country around Orvieto is fertile, and produces a delicate white wine, which is in great repute at Rome. (Della Valle, *Storia del Duomo di Orvieto*, 4to., Rome, 1791.)

ORY'ZA, the name by which rice was known to the Greeks and Romans, and which has been adopted by botanists as the generic name of the plant yielding that valuable grain.

The common rice, *Oryza sativa*, unlike many long-cultivated grains, is still found in a wild state in and about the borders of lakes in Hindustan, though never cultivated, because the produce is said to be small compared with that of the varieties in cultivation. The grain is however remarkably white, palatable, and reckoned very wholesome; hence it is carefully gathered, and sells dear. The rich esteem it a dainty, and, to make it still more delicate, boil it only in steam. The rice plant is therefore an undoubted native of Hindustan, from which country it has spread over a great part of the world, especially in Asia, where it forms the principal portion of the food of the inhabitants, but it has also from very early times been introduced into the southern parts of Europe.

Rice is no doubt the grain which yields food for the largest portion of the human race, but even in Hindustan great numbers do not eat rice. In fact in all the north-western provinces wheat is the principal crop, and the natives eat wheaten cakes. It abounds however in nourishment, being composed almost entirely of fecula, that is, 96 per cent., and therefore cannot be baked into bread; but it is more easily cooked. It is light and wholesome, and easily digested, and might form a much larger portion of the diet in Europe than it does. Europeans in India eat it at breakfast as well as at other meals, and with fish as frequently as with their curries.

Of the kinds imported into England, the Carolina is the best, and is grown in the marshy grounds of North and South Carolina. The grains

are shorter, broader, and boil softer than the Patna rice, which is the best Indian kind known in this country, though in India there are several superior varieties, as for instance the Pilibeet, which are much more esteemed there.

OSCI, or O'PICI, a people of ancient Italy, who seem to have been identical with the Ausonians, or Aurunci, and who inhabited the southern part of the peninsula. The names Opicus and Oscus are undoubtedly the same. Aristotle ('Polit.,' vii. 10) calls the country from the Tiber to the Silarus, Ausonia and Opicia; and other ancient writers extended the name much farther, to the Straits of Sicily, but the southern extremity of the peninsula appears to have been occupied previously by the Œnotrians, a Pelasgic people, who were conquered by the Lucanians and Bruttii. Cumæ, one of the earliest Greek colonies on the coast of Italy, was in the country of the Opici.

The Oscan language was the parent of the dialects of the native tribes from the Tiber to the extremity of the peninsula, Sabini, Hernici, Marsi, Samnites, Sidicini, Lucanians, and Bruttii, whilst in the regions north of the Tiber the Etruscan predominated. Livy (x. 20) mentions the Oscan as being the language of the Samnites. The older Latin writers, and especially Ennius, have many Oscan words and Oscan terminations. The Oscan language continued to be understood at Rome down to a late period under the Empire. In the Social War, the Confederates, who were chiefly people of Oscan descent, stamped Oscan legends on their coins. In Campania and Samnium the Oscan continued to be the vulgar tongue long after the Roman conquest, as appears from several monuments, and especially from the Oscan inscriptions found at Pompeii.

OSCILLATION and CENTRE OF OSCILLATION. The former signifies, in general, a movement of a body or system alternately on opposite sides of the position occupied when in a state of rest. When any system is slightly disturbed from its position of equilibrium, it either falls altogether or endeavours to recover the position which it lost. In the latter case the equilibrium is said to be stable, and in the former unstable. A pendulum hanging downwards is an instance of the stable kind, and the same pendulum, if it could be so nicely adjusted as to rest immediately over the pivot, would be of the unstable kind. The problem of oscillations usually refers to certain small deviations of a material body acted on by gravity, when it moves upon a horizontal axis; that is, to the laws of vibration in pendulums.

Let a material point, a very small body, be attached by a string or rod without weight to an immovable pivot. In the position of rest the string hangs vertically: let us now suppose it removed out of the vertical position and let go when it makes an angle a with the vertical. When t seconds have elapsed, let it make an angle θ with the vertical. The material point is acted on by gravity with a force which would produce an acceleration g (or 32.1908) feet in one second: if then l be the length of the string, the arc $l\theta$, through which the point must move before it arrives at the lowest point of its course, is diminished with a velocity which is accelerated by $g \sin \theta$ at the time specified, giving, by the well-known equations of motion,

$$\frac{d^2 . l\theta}{dt^2} = -g \sin. \theta.$$

This being integrated between the limits $\theta = 0$, $\theta = a$, gives, as may be seen in any Treatise of Mechanics, for the time (T) of a complete vibration, π representing 3.14159,

$$T = \pi \sqrt{\frac{l}{g}} \left\{ 1 + \frac{1}{4} \sin^2 \tfrac{1}{2}a + \frac{1.9}{4.16} \sin^4 \tfrac{1}{2}a + \&c. \right\}$$

This is a very convergent series. If a be very small we have, nearly,

$$T = \pi \sqrt{\frac{l}{g}};$$

or the time of the vibration of the same pendulum in different small arcs is very nearly independent of the lengths of the arcs.

Next, let a number of material points invariably connected together vibrate about a horizontal axis. It is required to find at what distance a single material point must be hung that it may vibrate in the same manner. A point in the system at the same distance, vertically, from the axis of motion is called the *Centre of Oscillation*.

Let a body M be imagined to consist of an infinite number of molecules m, m', &c., and let it turn on a horizontal axis of suspension; also let r, r', &c., be the perpendicular distances of m, m', &c., and k the perpendicular distance of the centre of gravity from the same axis; again, let θ be the angle which this last distance makes with a vertical line, and g represent the force of gravity: then, by the nature of the centre of gravity, $Mgk \sin \theta$ will express the momentum of the body's rotation on the axis of suspension. But $-\frac{d\theta}{dt}$ representing the angular velocity of the molecule m, the negative sign being used because θ diminishes while the time t increases in the descending arc: then, at the distance r from the axis, $-r\frac{d\theta}{dt}$ represents the actual velocity of the molecule, and $-mr^2\frac{d^2\theta}{dt^2}$ the momentum of rotation for that molecule: corresponding expressions denote the momenta for other molecules, and the sum of all may be represented by

$$-\int mr^2 \frac{d^2\theta}{dt^2}.$$

Equating this with the former expression, we have

$$-\frac{\int mr^2}{Mk} \cdot \frac{d^2\theta}{dt^2} = g \sin \theta.$$

If all the molecules were collected in one point at a distance l from the axis of suspension, we should have

$$-l\frac{d^2\theta}{dt^2} = g \sin \theta;$$

therefore $\frac{\int mr^2}{Mk} = l$, and l denotes the distance

of the centre of oscillation from the axis of suspension.

The most remarkable inference which may be drawn from the above equation is, that, if a horizontal axis passing through the centre of oscillation be made the axis of suspension, the point in which the former axis of suspension cuts the axis passing through the centre of gravity will become the centre of oscillation.

OSIER is the name given to various species of *Salix*, or Willow, employed in basket-making on account of their tough flexible shoots.

OSI'RIS, one of the principal Egyptian deities, was the brother of Isis and the father of Orus, and is said by many writers to have been the first king of Egypt. His history is given in the first book of Diodorus, and in the treatise of Plutarch, 'On Isis and Osiris;' but it is not improbable that the genuine Egyptian traditions respecting this deity had been considerably corrupted at the time of these writers. According to their accounts, Osiris was the first who reclaimed the Egyptians from a state of barbarism, and taught them agriculture and the various arts and sciences.

OSMAZOME, a name given to a spirituous extract of meat. According to the experiments of Chevreul, osmazome contains a peculiar substance, to which he has given the name of *créatin* (from κρέας, flesh).

O'SMIUM. This metal was discovered by Mr. Tennant, in the year 1803, in the grains of native platinum. It is white, with a bluish gray tint. It may be reduced to leaves. Its specific gravity is 10. It is unalterable in the air at common temperatures, but if strongly heated it oxidizes.

This very peculiar metal forms several compounds with oxygen, chlorine, and sulphur; but none of them are of much importance.

OSMUNDA, a genus of plants belonging to the natural order *Filices*, and to the sub-order *Osmundaceæ*. *O. regalis*, the Flowering Fern, is a native of Great Britain in boggy places, and often attains a height of from one to eight feet. It is very common in many parts of England, and especially on the lakes of Killarney in Ireland.

OSMUNDACEÆ. [FILICES.]

OSNABRÜCK (generally written *Osnaburg* in English) is a province of the kingdom of Hanover. It is divided into the following parts:—The principality of Osnabrück, 903½ square miles; the lower county of Lingen, 126½ square miles; the circles of Meppen and Emsbuhren, 693 square miles; and the county of Bentheim, 399 square miles: the area of the whole is 2122 square miles, and the population 227,000. The whole country is a part of the plain of northern Germany, and is generally poor and sandy. The chief produce is live stock, hemp, and flax; and the chief manufactures woollen stockings and linen.

Osnabrück was formerly a bishopric and of very great antiquity, being the first that was founded in Saxony by Charlemagne. After the Reformation the inhabitants embraced the Lutheran faith, and it was decided by the treaty of Westphalia that it should be governed alternately by a Roman Catholic and a Protestant bishop. In the year 1802 the country was made over to Hanover as an hereditary temporal principality.

Osnabrück, the capital, is situated in 52° 16′ N. lat. and 8° 1′ E. long., in a valley on the river Hase. It is surrounded with a wall and ditch, and has five gates. Like most of the old German towns it is irregularly built. The most remarkable public buildings are—the palace built in 1665, the cathedral, the Roman Catholic church of St. John, the Lutheran churches of St. Mary and St. Catherine, and the fine town-hall, in which the treaty of Westphalia was concluded at the same time as at Münster. The inhabitants, amounting to 11,000, have manufactures of coarse woollens, leather, linen, and tobacco.

OSPREY. [BALD BUZZARD; FALCONIDÆ.]

OSSETES. [GEORGIA.]

OSSIAN'S POEMS. [MACPHERSON.]

OSSIFEROUS BRECCIA, OSSIFEROUS CAVERNS. The existence of large fissures and caverns in rocks is a fact known to miners and quarrymen in all parts of the world. That these cavities are frequently filled with stalactical, sparry and earthy accumulations, and sometimes with the bones of animals, is another fact on which modern geologists have based a long train of ingenious inferences.

Great fissures and caverns, though not absolutely confined to limestone rocks, are yet by far of most frequent occurrence in these deposits. They are not common in all limestones, but have certain determinate relations to their mass and the positions which they occupy. It is peculiarly in *thick masses* of limestone that we find great caverns in England, Ireland, France, Belgium, North Germany, the Tyrol, Carinthia, Italy, Greece, North and South Africa, India, Australia, North and South America.

The occurrence of bones in the breccias, sediments, and stalagmitic incrustations which often fill these caverns, is sometimes to be explained by supposing them to have fallen with the other materials of breccia, or to have been drifted with sediments by water; but in a considerable proportion of the cases which have been examined there is no avoiding the conclusion that animals retired by choice, or through fear, or were dragged by violence into these cavities, and there have left their bones. This conclusion, established by the sagacity of Buckland for the hyæna caves of Kirkdale and Torquay, applies to the numerous bear caverns of the Harz, Franconia, and Westphalia, and to some caves in Brazil and Virginia.

OSSIFICATION, in Pathology, is an unnatural formation of bone. It is most frequent in the cartilages of the ribs, in which it almost constantly occurs in advancing years. The change is generally earlier in men than in women, and it affects the cartilage of the first rib sooner than the rest.

Next to the cartilages of the ribs those of the windpipe are most liable to become osseous. Ossification of the cartilages of the ear, nose, and Eustachian tube is, on the contrary, extremely rare, and in the few cases in which it occurs it is not particularly connected with old age. The cartilages of the movable joints never ossify.

The tendinous tissue is that which, next to the

cartilaginous, is most subject to ossification. This change is not uncommon at the insertion of the tendons of muscles that are much exerted, and in the ligaments of some fixed or scarcely movable joints. Small pieces of bone are also not unfrequently formed in the dura mater; and these are one of the sources of incurable epilepsy. Bone is also sometimes formed in the fibrous coats of the spleen and liver.

Ossification occasionally takes place in the false membranes produced by acute inflammation of the pleura, and more rarely in those of the pericardium; and it is a common process in the adhesions which form between the heads of bones exposed by ulceration of their cartilages, producing the most fixed kind of anchylosis of the joints. A few cases are recorded of ossification of the muscles.

In many cases the material formed exactly resembles true bone in its minute structure and chemical composition. In other cases, as in ossification of the heart and arteries, the substance deposited is composed of carbonate and phosphate of lime, as bone is, but its particles have no definite arrangement. That which is called ossification of the heart is not an affection of the proper substance of that organ, but of its valves, in which earthy matter is sometimes deposited, so as to render them stiff and unyielding, and destroy the pliancy which is necessary for the performance of their functions.

OSSOLA. [NOVARA.]

OSSORY, an Irish bishopric, is now united with those of Ferns and Leighlin, thus forming the united diocese of Ossory, Ferns, and Leighlin.

OSTADE, ADRIAN VAN, was born in 1610, at Lübeck; but though a German by birth, he is considered to belong to the Dutch School, having formed his style in Holland, where he studied under Frank Hals. There is such delicacy in his pencil, such warmth, transparency, and brilliancy in his colouring, and such a profound knowledge of chiaroscuro, that it is impossible not to admire his genius and execution, though his subjects are of the coarsest and most vulgar description.

His best works are extremely scarce and sell at very high prices. Some of them are in the collections of Sir Robert Peel, Lord Ashburton, Mr. Hope, his late Majesty George IV., and in the Bridgewater and Dulwich galleries. Ostade died in 1685, at the age of 75.

OSTADE, ISAAC VAN, born at Lübeck in 1617, was the brother of Adrian, from whom he learned the art of painting, and whose manner he closely imitated. He died young. There are pictures by Isaac Van Ostade at Sir R. Peel's, Lord Ashburton's, in the Bridgewater Gallery, and in the private collection of George IV.

OSTEND (*Oostende*), a fortified town and seaport of West Flanders, in 51° 14′ N. lat., 2° 54′ E. long., 88 miles by railway W. by N. from Brussels, has about 15,000 inhabitants. The town stands upon a plain, and is entered by four gates. Of late years it has been much frequented during the summer as a watering-place. The ramparts form an agreeable promenade. The water in Ostend is bad. The town-hall and the baths are the only note-worthy structures. Ostend has great facilities for carrying on trade with the interior by means of canals and railroads. It has daily communication with London and Dover by steam-packets. The harbour is safe, but the entrance to it rather intricate. Vessels of 200 and 300 tons pass by canal from Ostend to Bruges. Between 600 and 700 ships enter the harbour annually, and about the same number depart. The imports consist chiefly of colonial produce, wool, wine, and British manufactured goods; the exports are agricultural produce, flax, linen, leather, oak bark, tallow, salt, &c.

Ostend was inclosed with walls by Philip the Good in 1445, but was not regularly fortified until 1583. The Dutch sustained a siege in this town against the Spaniards, which began in 1601 and lasted until 1604, when it surrendered by capitulation. The town was taken by the allies in 1706, and in 1715 it was ceded by Holland to the Emperor of Germany. Louis XV. took it in 1745, after a siege of 18 days, in which the town was greatly injured, and restored it in 1748. In 1794 it was taken by the French, and remained in their possession until 1814, having been unsuccessfully attacked by the English in 1798.

OSTERODE. [GRUBENHAGEN.]

OSTERVALD, JEAN FRE'DE'RIC, born at Neufchâtel in Switzerland, in 1663, studied at Saumur, Orléans, and Paris, after which he returned to his native country, and in 1699 was appointed pastor of the Reformed church of the town of Neufchâtel. He published an edition of the Bible in French, which became popular among the French Protestants under the name of 'Ostervald's Bible,' and of which there have been several reprints. He published also, 'Abrégé de l'Histoire de la Bible;' 'Traité des Sources de la Corruption qui régne aujourd'hui parmi les Chrétiens;' a Catechism which is much used in the French Protestant churches, and is known by the name of 'Catéchisme d'Ostervald;' and other religious works. Ostervald died at Neufchâtel in 1747. He and his two friends, J. A. Turretin of Geneva, and Samuel Werenfels of Basel, did much toward the revival of religion in Switzerland; they were styled the 'Triumvirate of Swiss Divines.'

OSTIA, O'STIUM TIBERI'NUM, the name of the former port of Rome, situated at the southern mouth of the Tiber, is 16 miles from the capital. The ancient town of Ostia, which was situated below the fork of the river, spread in a semicircular form along a bend made by the left or southern branch, on a piece of ground slightly elevated above the surrounding sand and marshes. Ostia was founded by Ancus Marcius, according to Strabo. Under the Roman Empire it was a large town, but the site is now marked by mere shapeless masses of ruins. Ostia was in a ruined state as early as the sixth century A.D. In the middle ages Ostia somewhat revived. In the 14th century it was occupied by Ladislaus, king of Naples. It was fortified by Sixtus IV., who built the castle. The French, who had seized it, were driven away by Cardinal della Rovere, afterwards Julius II., whose trophies are still in the cathe-

dral. There are now about 100 inhabitants at Ostia in winter, and about 10 in summer. There is a small cathedral in good taste, a bishop's palace, and a few other habitable buildings. The castle or fort of Ostia consists of three or four lofty but ruinous brick towers, united by a curtain and surrounded by a ditch. (Gell's *Topography of Rome and its Vicinity*, and *Map* accompanying it: Valéry, *Voyages en Italie*.)

OSTRACEANS. [OYSTERS.]

OSTRACISM, the name for a singular institution existing for some time among the Athenians. When any man became conspicuous by wealth or by power, and was in consequence thought likely to conceive plans of ambition dangerous to the stability of the existing form of government, this institution enabled the Athenian people to send him for a time into exile, and thus rid themselves of the danger which they dreaded. When the occasion was thought to require it, a day was fixed at an ordinary meeting of the Athenian people, for the purpose of holding an *Ostracism*. On that day a part of the market-place was railed in, ten different approaches being left to the part thus railed in. There was thus one approach for each of the ten Athenian tribes. By these approaches the citizens, distributed according to their tribes, entered the space within the rails, and there deposited, in urns provided for the purpose, their shells or bits of earthenware (ὄστρακα, *ostraca*, whence the name *Ostracism*), marked with the name of the person whom they respectively thought it desirable to banish. The nine archons, together with the Proëdri and Prytanes, superintended, seeing that everything was done properly, and in the end counting the votes. First of all they counted the gross number, which it was necessary should be above 6000, else there was no valid Ostracism. If there were found to be 6000 votes, they then proceeded to count the numbers against different individuals; and, according to the account given by Plutarch, the individual against whom there was the greatest number of votes was sentenced to ten years' banishment, or, in other words, was *ostracised*. According to the Scholiast on Aristophanes and Pollux, it was necessary that there should be 6000 votes against the individual ostracised, and that a mere majority short of 6000 was not sufficient. Whichever of these two accounts is adopted, the person who was ostracised was obliged to leave Athens within ten days after the sentence, and unless a vote of the people recalled him before the expiration of that time, he had to stay in exile for ten years. The goods of the ostracised person were not confiscated; neither was Ostracism considered a disgrace. It passed for what it was, a declaration of superior wealth or superior influence, whose ascendancy the state dreaded. It is well known that Aristides the Just was one of those on whom Ostracism was inflicted.

A similar institution is said to have prevailed in Argos, Miletus, and Megara. At Syracuse also it prevailed, and there bore the name *Petalism*, leaves (πέταλα) being used on the occasion of voting, instead of shells.

OSTREA. [OYSTERS.]

OSTRICH. [STRUTHIONIDÆ.]

OSTROGOTHS, or Eastern Goths, a division of the great Gothic nation, were settled in Pannonia in the fifth century of our æra, from whence they extended their dominion over Noricum, Rhætia, and the Illyricum. About the year 482 or 483 A.D., their king Theodoric was serving as an auxiliary under the emperor Zeno, and distinguished himself in Syria. He afterwards invaded Italy, defeated Odoacer, and made himself king of Italy.

OS'TRYA, Hop Hornbeam. Two species are known: the one, *O. vulgaris*, a native of the South of Europe; the other, *O. virginica*, of the United States; these are possibly mere varieties of each other.

OSU'NA, the ancient *Ursao*, a town in the province of Sevilla, in Spain, is situated in 37° 17′ N. lat., 5° 9′ W. long., about 40 miles E. by S. from the city of Sevilla, and on one side of an extensive plain, at the foot of an eminence which is crowned by a church. The town is semicircular in form, and is of considerable size; it contains above 2300 houses, and 16,000 inhabitants. It has one parish church and a splendid collegiate church, beneath which are catacombs; 4 hospitals, 2 barracks, 10 large inns, and a public granary. The university, which was celebrated in the time of Cervantes, was abolished by royal decree in 1824. The town is neat and pretty, and has some fine promenades in its immediate vicinity. The climate is salubrious, except during the heats of summer, which are at times excessive. The population of Osuna is almost entirely agricultural; the only manufactures are mats, ropes, and baskets from the *esparto* rush. Many Roman remains have been found in the town. (Miñano; Hirtius, *Bell. Hisp.*, xli.)

OSWEGO. [CANADA; NEW YORK.]

OSWESTRY. [SHROPSHIRE.]

OTAHEITE, or more properly *O Tahiti*, is the largest of the Society Islands, a considerable group situated in the Pacific Ocean between 16° and 18° S. lat. and 148° and 153° W. long. Otaheite is about 45 miles long, and more than 130 miles in circumference. It consists of two peninsulas of unequal extent, united by a low isthmus, somewhat more than 3 miles wide. The north-western and larger peninsula is called Opureone or Tahiti-nue (Great Tahiti), and the south-eastern Tiarraboca, or Tahiti-iti (Little Tahiti). The island is surrounded at a distance of from 3 to 6 miles by a coral-reef, which has several breaks, and affords many good anchorages. The interior of both peninsulas is occupied with mountain masses, which terminate in high and sharp peaks. The most elevated of these peaks, called Opureone, rises to between 7000 and 8000 feet above the sea-level.

The climate is very mild and generally healthy. The productions are numerous, especially the plants which supply food for man. Food, cloth, oil, and cordage are obtained by the natives from various plants. Timber is abundant. English domestic animals have been introduced.

Otaheite was discovered in 1606, by the Spaniard Quiros. It was afterwards visited by

Wallis, Bougainville, and Cook. Missionaries made a settlement on the island in 1797; and during half a century they have done much to civilise the natives, who are of the Malay race.

OTHMA'N (*Ibn Affán*), the third khalif of the Moslems after Mohammed, was a direct descendant from Abd-al-Menaf, one of the ancestors of the prophet. Having adopted Islám, he became one of Mohammed's most zealous *askáb* (companions), followed him in his flight from Mecca to Medina, and was made, on his return, one of his most confidential friends and secretaries. Othman was chosen khalif after the death of Omar, and was invested with the supreme power in 644. During the reign of Othman, his armies extended the Mohammedan Empire on all sides, while he himself was rapidly losing the affections of his subjects by the weakness of his internal administration and his partiality towards the members of his family. Othman also rendered himself obnoxious by occupying on the *Minbar* (pulpit), and while at prayers in the mosque, the same place which the prophet had used, instead of placing himself, as his predecessors Omar and Abú Bekr had done, a few steps lower down. He had otherwise offended some of their superstitious prejudices; and besides taking various places of command from those to whom his predecessors had entrusted them, he had recalled from his exile Hakem Ibn Aass, whom the prophet had banished from Mecca. Remonstrances having proved ineffectual, the people rose in revolt, Othman was besieged in his palace, and eventually killed by Mohammed, the son of Abú Bekr, whom Ayesha, the widow of the prophet had found means to incense against him. This happened in June 656. Othman was the first who caused an authentic copy of the Korán to be made, from which all others were to be transcribed.

OTHMA'N I., surnamed *Al-Gházi* (the Conqueror), the founder of the dynasty now reigning at Constantinople, was born at Súkút in Bithynia, in 1259. The Turkish and Arabian historians do not agree as to his origin, but the general opinion is, that he was the son of Orthogrul, a Turkman or Oguzian chieftain, who, having entered into the service of the Sultán of Iconium, established himself with his tribe at Súkút, on the banks of the river Sangar. After the death of Masúd II., the last of the Seljúkides, his dominions were shared among his generals, and part of Bithynia fell to the lot of Othmán, who thus found himself master of a small territory. In July, 1299, he invaded the territory of Nicæa, and subdued the whole country by 1304. In 1307 he invaded and reduced the country of Marmara. In the course of many years of warfare he conquered the remainder of Bithynia and the neighbouring provinces. At length his son and successor, Orkhán, gained possession of Prusa, but the welcome news did not arrive till Othmán was almost insensible, owing to old age and infirmities. Othmán died in 1326. He was famed for his moderation, justice, and military talents. Such was the commencement of the Turkish Empire, which, from his name, has received the appellation of Othoman or Ottoman Porte.

OTHO, MARCUS SA'LVIUS, was born on the 28th of April, A.D. 31 or 32. He was descended of an honourable family, which originally came from Ferentinum (Ferentino). His grandfather, who belonged to the equestrian order, was made a senator through the influence of Livia Augusta; and his father, Lucius Otho, was advanced to offices of great honour and trust by the emperor Tiberius. Marcus Otho was an intimate friend of Nero during the early years of his reign, and his associate in his debaucheries; but Nero's love for Poppæa, whom Otho had seduced from her husband, produced a coolness between them, and occasioned the honourable banishment of Otho to the province of Lusitania, of which he was appointed governor. In this province, which he governed, according to Suetonius, with great justice, he remained for ten years; and afterwards took an active part in opposition to Nero and in placing Galba upon the throne, A.D. 68. When Galba adopted Piso Licinianus as his successor, Otho formed a conspiracy among the guards, who proclaimed him emperor, and put Galba to death. [GALBA.]

Otho commenced his reign by ingratiating himself with the soldiery, whom Galba had neglected to conciliate; but his reign was short. Vitellius, who had been proclaimed emperor by the legions in Germany a few days before the death of Galba, sent Cæcina, one of his generals, to secure the passes of the Alps, while he himself remained in his camp upon the Rhine. Otho marched against Cæcina, and at first was successful; but his army was defeated by the troops of Vitellius in a hard-fought battle near Bebriacum, a village on the Po, south-west of Mantua. When Otho, who was not present at the engagement, heard of his loss, he committed suicide, after a reign of 95 days.

(Tacit., *Hist.*, i. ii.)

OTHO I., son of the Emperor Henry I., and Duke of Saxony, was elected, after his father's death, in 937, his successor on the throne of Germany. His reign was long and eventful; a great part of it was occupied in quelling the turbulence of the great feudatories, the dukes of Bavaria, Franconia, and Lorraine, the archbishop of Mainz, and of his own son and son-in-law, who had rebelled against him. In Italy he appeared first as the champion of Adelaide, the young widow of King Lotharius, who had been imprisoned and otherwise ill-used by Berengarius, who had usurped the Italian crown. Otho liberated Adelaide, whom he married at Pavia in 951, and permitted Berengarius to retain the sovereignty of Italy, but as his vassal. After some years, fresh complaints of the tyranny of Berengarius induced Otho to recross the Alps: he defeated Berengarius, and was himself acknowledged by a Diet held at Milan as king of Italy, and crowned at the close of 961. In the following year Pope John XII. crowned him Emperor of the West, as successor of Charlemagne.

Otho, having received numerous complaints against Pope John, visited Rome, and assembled a council, by which John was deposed, and Leo VIII. elected in his place. John however, after Otho's departure, regained the papal throne, but

died in 964, upon which the Roman clergy elected Benedict V. This brought Otho again to Rome, which he besieged and took. He banished Benedict and reinstated Leo, who however died the year after, when John XIII. was elected with Otho's approbation. But the Romans revolting against the new pope, Otho again entered Rome, put the leaders of the insurrection upon their trial, hanged 13 of them, and condemned the others to various punishments.

In 967 Otho had his son Otho II. crowned Emperor and his colleague, at Rome, by Pope John XIII. He afterwards made war against the Emperor of Constantinople; but after the murder of Nicephorus Phocas, his successor Zimisces made peace with Otho, and gave the Princess Theophania in marriage to his son, in 972. Otho returned to Germany, where he died in May, 973. Otho has been styled 'the Great,' a title which he deserved for his abilities, his success, and his love of justice.

OTHO II., son of Otho I., was engaged after his father's death in a war with Henry, duke of Bavaria, whom he defeated, and whose fief he bestowed on the Duke of Suabia. He had also to contend against Lotharius, king of France, for the great fief of Lotharingia, or Lorraine. Otho divided Lorraine into two fiefs, upper and lower, the latter of which he left to Charles, Lotharius's brother, on condition that he should pay allegiance to the German crown. In 979 Otho repressed a sedition at Rome, and punished several of the leaders. From Rome he advanced into Apulia and Calabria, where he fought against the Saracens. Otho occupied Tarentum, and at first was successful against the Saracens; but was afterwards defeated by them with great slaughter. Returning to Northern Italy he assembled a general diet of the feudatories of Germany and Italy at Verona, in 983, at which his son, then four years old, was acknowledged as his successor. From Verona Otho proceeded to Ravenna, and afterwards to Capua and Benevento, intent upon collecting a large army against the Saracens, whom he wished to expel from Sicily. But in Dec., 983, he fell ill at Rome, where he died.

OTHO III. spent his long minority in Germany, whilst his grandmother Adelaide, his mother Theophania, and the Archbishop of Cologne administered his dominions in Germany and Italy. In 996 Otho entered Italy with a large army, and was crowned Emperor of Germany, at Rome, by Pope Gregory V. On his return to Germany he defeated the Slavi, and forced Micislas, duke of Poland, to do him homage. At the end of 997 Otho returned to Italy, and having collected his army at Ravenna, he marched upon Rome, whence Pope Gregory V. had been expelled by the patrician Crescentius, styled Consul of Rome, who caused John, a Calabrian Greek, to be proclaimed pontiff, under the title of John XVII. On the arrival of Otho John was seized and cruelly mutilated; and Crescentius was made prisoner and beheaded, with twelve of his followers. Otho returned to Germany, but in 1001 was again in Italy. He fought several battles in Campania, besieged Benevento, and afterwards quelled some fresh disturbances in Rome. In the following year, 1002, he was taken ill near Civita Castellana, and died.

OTHO IV., duke of Brunswick and son of Henry the Lion, was elected King of the Germans in 1208, and was afterwards crowned Emperor at Rome by Innocent III. But he soon quarrelled with that imperious pontiff about the right of nominating to vacant benefices. He was deposed in 1212, and Frederic of Hohenstauffen, king of Sicily, was called to the throne. Otho however had still a considerable party, and protracted the contest till 1215, when he resigned his claims to his rival.

OTHO, or OTTO, OF FREYSINGEN, born about 1108, was the son of Leopold, margrave of Austria, and of Agnes, daughter of the Emperor Henry IV. He entered the order of St. Bernard in the abbey of Morimond, of which, in 1136, he was made abbot. His relative Conrad III., king of the Germans, made him bishop of Freysingen in 1138. He afterwards followed Conrad in the crusade to Palestine. On his return, he felt a wish to visit the abbey of Morimond again, where he died in 1158. He wrote a chronicle of the world in 7 books, 'Ottonis Episcopi Frisingensis Rerum ab Origine Mundi ad ipsius usque Tempora,' fol., Augsburg, 1515: this was continued down to the year 1210 by another Otho. He also wrote 'A Treatise concerning the End of the World, according to the Book of Revelations,' and 'A History of the Emperor Frederic I., called Barbarossa, 'De Gestis Frederici Ænobarbi libri duo,' which comes down to the year 1159. Otho is one of the most trustworthy historians of the period generally called the dark ages.

OTOLICNUS, Illiger's name for the *Galagos* of Geoffroy. This genus forms one of the family of the *Lemuridæ* [LEMURIDÆ], and is, as far as is now known, restricted to Africa. (See Dr. Smith's 'Illustrations of the Zoology of South Africa.') Habits arboreal; frugivorous and insectivorous; fond of the gum of trees; ears expansive, and closed during sleep, but opened upon the least noise. Extremely active, quick, and alert.

OTOPTERIS is a genus of fossil ferns, of which several species have been described. Five certain species only are known, from the beds above the coal-measures, and chiefly from the lias and oolitic formations, of which they are a characteristic feature; these are *O. cuneata, Beanii*, and *acuminata*, from the oolite, *obtusa* from the lias, and *Dufresnoii* from the new red-sandstone.

OTRANTO, TERRA DI, one of the territorial divisions of the kingdom of Naples. It is bounded by the province of Bari on the N.W., by that of Basilicata on the S.W., and by the sea on every other side. Its greatest length is about 100 miles, and breadth 30 miles. The peninsula is traversed in its length by a ridge of low calcareous hills. There are no rivers properly so called in this peninsula.

The population amounted in 1845 to 401,488. It is distributed among four districts, Lecce, Taranto, Brindisi, and Gallipoli, which are subdivided into 122 communes and 190 parishes.

More than two-thirds of the population live by agriculture.

The following are principal towns of the province of Otranto:—Brindisi. Lecce. Taranto. *Gallipoli* is a town of considerable commercial importance, built on a rocky peninsula. It contains, together with the suburb called Lizza, about 13,000 inhabitants, is a bishop's see, and has a good roadstead and harbour. It is the most trading seaport on the Adriatic side of the kingdom. It has ample cisterns cut in the rock for containing the oil, which is the chief produce of the country. *Otranto*, the ancient Hydruntum, once a flourishing town, has been in a decaying state since its capture and pillage by the Turks in 1480. The present population hardly exceeds 2000. Otranto has an old cathedral and a castle. The province also contains Alessano, near Capo Leuca, with about 7000 inhabitants; Castellaneta, with 5000; Nardò, with 4000; Francavilla, with 12,000; and Manduria, with 5000. Some Greek or Epirote colonies are scattered about the province: the principal villages inhabited by them are San Marzano, Martana, and Calimera.

The peninsula of Otranto was anciently called by various names: Iapygia, Messapia, Calabria, and the country of the Salentini. The Romans divided the same ancient tract between Apulia and Calabria.

OTTAJANO. [Naples, Province.]

OTTAWA. [Canada.]

OTTER. Mr. Bell, with great propriety, as we think, places the otters among the *Mustelidæ* (order *Carnivora*), as an aquatic piscivorous section of that family. Through the Sea-Otters (*Enhydra*) these animals connect the Polecat tribe (*Mustelidæ*) with the Seals (*Phocidæ*), the transition being very natural.

The genus *Lutra* is widely diffused; Europe, Asia, Africa, and America, present us with their respective species; all however agree with each other in general habits and manners.

The genus *Lutra* may be thus characterised:—Head compressed; eyes rather large; ears very short; whiskers very stiff; tongue rather rough; body very much lengthened; legs short; the feet with five toes and webbed; tail long, stout, flattened horizontally, and covered with short hair.

$$\text{Incisors, } \frac{6}{6}; \text{ Canines, } \frac{1-1}{1-1}; \text{ Molars, } \frac{5-5}{5-5} = 36.$$

Example, the Common Otter (*Mustela Lutra*, Linn.; *Lutra vulgaris*, Erxleb). Locality, Europe generally.

This, there can be little doubt, is the ἔνυδρις (Enhydris) of Aristotle and the Greeks, and the *Lutra* of the Romans. It is the *Lodra*, *Lodria*, and *Lontra* of the Italians; *Nutria* and *Lutra* of the Spanish; *Loutre* of the French; *Otter* and *Fisch Otter* of the Germans; *Otter* of the Dutch; *Utter* of the Swedes; *Odder* of the Danes; and *Otter* of the British.

The natural food of the Common Otter is fish, for the chace and capture of which its whole frame is beautifully adapted. How silently is the water entered! The eyes are so placed that whether the animal is swimming below its prey, behind it, above it, or beside it, their situation, or, at most, the least motion of the head and neck, brings it within the sphere of the pursuer's vision. The whole frame-work of the animal, its short fin-like legs, oary feet, and rudder of a tail, enable it to make the swiftest turns, nay, almost bounds, in the water, according as the rapidity of its agile prey demands a sudden downward dive, an upward spring, or a side snap. The short fur, which is close and fine, keeps the body at a proper temperature, and the longer and outer hairs directed backwards enable it to glide through the water, when propelled horizontally by its webbed feet beneath the surface, noiselessly and speedily. Easy and elegant in its motions, there are few objects more attractive in menageries than the pond, especially if it be kept clean, and supplied with clear water, wherein the otter is seen to hunt its living prey. When it has seized a small fish, it instantly leaves the water and devours it, beginning with the head, whilst the body is held between the fore-paws. Larger fish are held down by the paws, and the head and tail are often left uneaten. The havoc made by these animals in rivers and ponds is great; for they will go on killing, and eat but a small portion of each fish, if it be large, when they find plenty of prey. When fish is scarce, and it is pressed by hunger, Mr. Bell states that the Otter has been known to resort far inland, to the neighbourhood of the farm-yard, and attack lambs, sucking-pigs, and poultry. Mr. Macgillivray tells us, also, that it has been known to attack young domestic animals, and the latter zoologist found the stomach of one, which was killed in June, filled with a curious collection of larvæ and earth-worms. The period of gestation is said to be nine weeks, and the number of young produced varies from three to five. The Otter's places of refuge near rivers and lakes are beneath the roots of trees or in holes.

Otter (*Lutra vulgaris*).

But it must not be supposed that the Common Otter is, as it has been asserted, confined to the fresh waters. They are known to frequent the sea in the north of Scotland, and to hunt far out. In the south of England (Cornwall) the Otter will go a mile from the shore in the summer and good weather after its prey, according to Mr. Couch. On the sea-shore, rocky coves with scattered blocks, hollows, and cavities under large stones,

are its haunts. These marine Common Otters must not be confounded with the Sea Otter (*Enhydra*).

That the Common Otter is capable of domestication and attachment we have ample testimony. Indeed in some parts of India, according to the testimony of Bishop Heber, a fine species of Otter (*Lutra Nair*) is trained to assist the fishermen, 'sometimes driving the shoals into the nets, sometimes bringing out the larger fish with their teeth.' (Bishop Heber's 'Journal.')

Of the African *Lutræ*, we may mention the *Lutra Capensis* (Genus *Aonyx* of Lesson).

In North America our Common Otter is represented by the *Lutra Canadensis*, and in South America by the *Lutra Brasiliensis*. Extensive importations of otter-skins into Europe, both from North America (Quebec) and from South America (Buenos Ayres), annually take place. (Bell's 'British Quadrupeds.')

The genus *Enhydra* is decidedly distinct from *Lutra*, and is in form more adapted to an oceanic existence. One species only is as yet known, the Sea-Otter (*Mustela Lutris*, Linn.; *Lutra marina*, Steller; *Enhydris Stelleri*, Fischer; *Enhydra marina*, Fleming). The Sea-Otter is a native of the north-west coast of America, from California to 60° N. lat.; and of the opposite coast of Asia, from the Yellow Sea northwards to Kamtchatka and the intermediate islands. Its fur is very valuable, and is an object of commerce. The Russians procure it for the Chinese market, where it sells for a high price.

OTTER-HOUND, a variety of hound employed in the chase of the otter. As it is necessary that otter-hounds should not only have good noses, but take the water freely, some care is necessary in attending to the breed, if a good pack is to be the result. Mr. Daniel recommends a cross between the harrier and terrier.

OTTERY ST. MARY. [DEVONSHIRE.]

OTTMER, KARL THEODOR, born in the city of Brunswick, Jan. 19, 1800, was the son of a physician. While completing his studies in architecture at Berlin, in 1822, he competed for and was employed to erect the new theatre there, called the 'Königstädter Theater,' which was begun in July 1823, and opened in August 1824. This decided success on the part of one so young, brought Ottmer forward at once: it should however be mentioned that, although it was not known at the time, his designs were corrected by Schinkel. After studying a short time in Paris, he visited Italy, where he remained nearly two years (1827–9).

The Duke of Saxe-Meiningen, not long after, commissioned Ottmer to make designs for a theatre and casino at Dresden, and the buildings were forthwith commenced. On his return to Brunswick he published in 1830, the first part of his 'Architektonischen Mittheilungen,' containing plans, &c., of his Theatre at Berlin. In Sept. 1830, the palace at Brunswick was set fire to and destroyed, and he was thereupon directed by the new Duke, Wilhelm, to make designs for rebuilding it. The edifice, which is one of the largest and most elegant palaces in Europe, was begun the following year, and prosecuted with such activity as to be ready for habitation in 1837. Besides the palace, Ottmer erected at Brunswick several other structures, both public and private, all of them, more or less, of architectural note. Naturally of a delicate constitution, he sank under the multiplicity of his tasks, Aug. 22, 1843.

OTTO OF ROSES. [ATTAR OF ROSES.]

OTTOMAN EMPIRE. [TURKEY.]

OTWAY, THOMAS, was born at Trotten, in Sussex, March 3, 1651. He received his education at Winchester School, and was entered a commoner of Christ-Church, Oxford, in 1669. Having left the University without a degree, he went to London, where he tried his fortune as an actor, but met with little success. In 1675 he produced 'Alcibiades,' his first tragedy, and 'Don Carlos, Prince of Spain.' 'Titus and Berenice' and the 'Cheats of Scapin' were published in 1677, the first of which was translated from Racine, and the latter from Molière. 'Friendship in Fashion' was published during the following year. Otway then served as an officer in the army of Flanders; but not liking the military life, he gave up his commission, and returned to London, where he again began to write for the stage. 'The Orphan,' one of the most pleasing of all his plays, was performed in 1680, as was also the 'History and Fall of Caius Marius.' In 1681 appeared the first part of a comedy called the 'Soldier's Fortune,' which was completed by the addition of a second part under the title of 'The Atheist,' in 1684. The greatest of all his dramatic efforts however was his 'Venice Preserved,' which was performed in 1682, and still keeps possession of the stage. An edition of his whole works was published in 3 vols. 12mo., in 1757; and another in 4 vols. 8vo., in 1813. His writings, although so numerous, did not secure him from the miseries of indigence. He died April 14, 1685.

OUDE, a kingdom of Hindustan, is bounded S. by Allahabad, N. by Nepaul, E. by Bahar, and W. by Delhi. Its greatest length S.S.E. to N.N.W. is about 200 miles; its greatest breadth E. by N. to W. by S. is about 130 miles. The area is estimated at 20,000 square miles, and the population at 4,000,000.

Oude was formerly a soubah, or subordinate government, of the Mogul's dominions. By various treaties between successive Viziers and the British government, Oude became one of those dependent states of Hindustan over which the British have supreme political control. In 1819 the reigning prince renounced his nominal allegiance to the Mogul, and assumed the title of *King*. Oude forms a portion of the plain of the Ganges, and the general character of the country is noticed under HINDUSTAN, vii. 20. LUCKNOW is the capital of the kingdom.

OUDENARDE. [FLANDERS, EAST.]

OUGHTRED, WILLIAM, was born at Eton, in Buckinghamshire, in 1573. He was educated at Eton, and was elected thence, in 1592, to King's College, Cambridge. While he was an undergraduate he invented 'An Easy Method of Geometrical Dialling,' but which was not given to

the public before the year 1647. In the year 1603 or thereabouts, Oughtred was ordained priest, and presented to the rectory of Albury, near Guildford in Surrey. At the age of eighty, if we may believe Mr. Collier, he died in an ecstasy of joy upon hearing of the restoration of Charles II. Oughtred was one of the first among the English mathematicians of his day: he was the inventor of the Sliding Rule.

OUJEIN. [HINDUSTAN, vii. 204.]

OUNCE. [WEIGHTS AND MEASURES.]

OUNCE. [LEOPARDS.]

OUNDLE. [NORTHAMPTONSHIRE.]

OUSE. [SUSSEX; YORKSHIRE.]

OUTLAWRY. This term, which is derived from the Saxon *Utlagh* or *Uthlagh*, signifies an exclusion from the benefits and protection of the law. In English law it is a punishment consequent upon a flight from justice, or a contumacious neglect or refusal to appear and answer for a civil or criminal transgression, in obedience to the process of a court of competent jurisdiction.

The consequences of outlawry are the forfeiture of goods and chattels. Where it takes place upon a prosecution for *treason* or *felony*, all the outlaw's real property, as well as his personalty, is forfeited. Where it takes place upon criminal prosecutions for misdemeanors, or upon civil actions, the profits only of the defendant's lands are, during his life, forfeited to the crown. The outlaw is incapable of maintaining any action.

No person can be outlawed without sufficient notice of the process of the court, and without satisfactory proof of his contumacy.

An outlawry may be reversed by writ of error, in which the party may avail himself of errors either of law or fact. In modern times it is the usual course for the courts to reverse outlawries upon motion, without obliging the parties to sue out writs of error or procure pardons.

OVAL, or as the name imports, egg-shaped, is the name given originally to such a form as the section of an egg presents, round, but not circular. In mathematics it has received some extension of meaning. Any curve, or isolated branch of a curve, which returns into itself, would be called an oval: perhaps even a figure of eight would receive the name.

OVAR. [BEYRA.]

OVER. [CHESHIRE.]

OVERBURY, SIR THOMAS. [JAMES I.]

OVERSEER, an officer appointed by justices of counties or boroughs, for parishes under the 43 Eliz., c. 2, and for townships under the 13 & 14 Car. II., c. 12. They cannot be less than two nor more than four for one parish or township. Churchwardens are ex-officio overseers of the poor, but an appointment of a churchwarden as overseer to act in both capacities is void. The duties of an overseer and of an assistant-overseer are identical, the latter being a paid officer, appointed under the 59 Geo. III., c. 12, where, on account of the amount of the population, the extent of the parish, or other difficulties, the services are onerous and troublesome. Assistant overseers to take the duties of five or six townships are also appointed by the Commissioners under the Poor-Law Act. Before the passing of the Poor-Law Amendment Act, it was the business of an overseer as well to appropriate and distribute, as to make out and collect, the poor-rates. Where no select vestry existed, he was judge of the necessities of applicants for and receivers of parochial relief, an appeal in case of refusal lying before magistrates in petty sessions. The present duties of an overseer in parishes subjected to the operation of the Poor-Law Amendment Act (7 & 8 Vic. c. 101) relate to the following matters:—1, to the management of the poor and to the board of guardians of the district; 2, to returning lunatic lists (where the township for which he acts is not in union under the Poor-Law Act, but where it is in union the clerk of the Guardians by the 5th and 6th Vic. cap. 57, sec. 6 is to make out the lunatic lists) and jury lists; 3, to the registration of voters.

OVERTON. [FLINTSHIRE.]

OVERTURE, a musical composition for a full instrumental band, introductory to an oratorio, opera, or ballet; a kind of musical prologue, and, as such, ought to be in good keeping with the piece which it ushers in.

OVERYSSEL, a province of the kingdom of the Netherlands, situated between 52° 6′ and 53° 52′ N. lat., 5° 40′ and 7° 5′ E. long., is bounded N. by Friesland and Drenthe, E. by Hanover and Westphalia, S. by Guelderland, and W. by Guelderland and the Zuyder Zee. It is a low level country, containing a few hills, and has a wet marshy soil, fertile in some spots, but interspersed with many sandy heaths, and towards the east with peat moors. The chief river is the Yssel, which runs along the frontier of Guelderland, and is 500 feet in breadth; it is joined at Deventer by the Schiepbeek, and falls into the Zuyder Zee below Kampen; other rivers are the Zwarte Water, the Vechte, and the Linde. A canal connects the Yssel with the Zwarte Water. The products are—corn, flax, rape seed, pulse, potatoes, garden fruits, plums in great abundance, and some timber. The inhabitants derive considerable wealth from breeding cattle, and digging peat. The pastures are rich, and great numbers of cows, horses, and sheep are bred. Considerable profit is derived from the breeding of bees and from the fisheries. The manufactures are linen, woollens, cotton, and paper: there are iron works at Deventer.

The area of the province is 1280 square miles, and the population in 1848 was 212,079. It is divided into three districts, named Zwoll, Almelo, and Deventer, from the chief town in each. *Zwoll*, the capital of the province, is a well-built town on the Zwarte Water. It is defended by a rampart, which is planted with avenues of trees, and by very strong outworks. It has three gates, leading to as many suburbs, eight churches, a house of correction, and a Latin school. The inhabitants number 15,500, and carry on a considerable trade. *Deventer*, on the right bank of the Yssel, over which there is a bridge of boats, is a fortified town, with a population of 11,000. There are seven churches, the principal of which has some fine paintings on glass; and a gymnasium. The manufactures and

trade are very considerable. *Almelo*, on the Vechte, has 2500 inhabitants, who manufacture woollens and linen. Other towns in this province are—*Kampen*, a fortified seaport town near the mouth of the Yssel, with a population of 8000; it is a place of considerable trade; steamboats ply regularly up the Yssel to Arnhem on the Rhine, and across the Zuyder-Zee to Amsterdam: Enschede, 2600 inhabitants: Steenwyck, 2500 inhabitants: Borne, 3000 inhabitants: and Hengelo, 2500 inhabitants.

OVI'DIUS, PU'BLIUS, surnamed NASO, was born at Sulmo in the country of the Peligni, B.C. 43, the same year in which Cicero was murdered. Ovid was of an equestrian family. From his boyhood he was fond of writing verses, but his father discouraged his poetic aspirations on the ground that poverty was the condition of poets, and the youth accordingly tried to prepare himself for the career of the bar. On attaining the suitable age, Ovid discharged the office of one of the Triumviri, and other public duties subsequently. He also acted as one of the court of the Centumviri, and on several occasions as a judex. But poetry was his delight, and he resolved to dedicate himself to it. He accordingly sought the society of the contemporary poets whose names he has himself recorded. He was acquainted with Macer, Propertius, Ponticus, Bassus, and Horace, who was about twenty-two years older. He only just saw Virgil and Tibullus, both of whom died B.C. 18. He was married to his first wife when he was very young. The match was not a suitable one, and the wife was soon divorced. A second wife was in like manner put away, though the poet had no serious charge to make against her. He ventured to take a third wife, with whom he lived happily to the time of his exile. He had a daughter, probably by his third wife.

Ovid spent an easy life at Rome in the enjoyment of the society of his contemporary poets and friends. He was intimately acquainted with the family of Augustus, and probably enjoyed the emperor's favour; but at the close of the year A.D. 8 he was, most unexpectedly to himself, banished from Rome, and sent to reside at Tomi, near the coast of the Euxine. Before his banishment he had written his three books of 'Amores,' his 'Heroides,' and his three books 'Artes Amatoriæ.' Ovid's exile was for life; and all his abject flattery of the emperor and his perpetual lamentations could not procure a revocation of his sentence. The cause of his exile has been a subject of much literary discussion. He distinctly mentions his amatory poetry as one of the causes of his exile; but there was another fault (error) which he does not mention ('Trist.' ii. 207). During his exile, he wrote the five books of his 'Tristia,' and the four books of the 'Letters from Pontus.' The letters are addressed to his wife in a most affectionate strain, and to some of his friends. The fifteen books of the 'Metamorphoses' were unfinished when he was banished, and it is said that the poet burned his own copy; but there were other copies in existence. The twelve books of the 'Fasti' were finished during his exile: the first six books only are now extant.

Ovid died at Tomi, A.D. 18, in the sixtieth year of his age, and the tenth of his banishment. Augustus died four years before him, and as his successor Tiberius did not recall him, it is probable that he had incurred the resentment of Livia Augusta, who had great influence over her son Tiberius. During his exile, he wrote a poem in the Getic language, in praise of Augustus and his family, a proof of the poet's aptitude for language, and the versatility of his talent. The poems of Ovid are one of the most valuable parts of Roman literature. The fertility of his invention, his pure taste, his excellent judgment, and the ease of his versification, place him in the first rank of all poets. He had an eye for the beauties of the country, and his brief descriptions of natural scenery can hardly be surpassed for fidelity and pictorial effect. Though his topics were often very simple, and though he handled them in every variety of form, he is seldom wearisome: he gave infinite variety to subjects which in ordinary hands would have been soon exhausted. In his elegiac poetry there is perhaps too much of antithesis, but antithesis was a characteristic of Roman writers, and perhaps of the Roman language, and the elegiac verse lends itself easily to it, and seems to invite it. The character of some of his amatory poetry is without excuse, and was calculated to degrade morality; but the age was licentious, and the poet went with his time. His good taste generally kept him free from gross obscenity, but the voluptuous colouring of some of his poetry is more seductive and more corrupting than the occasional grossness of Horace. The character of the man appears to have been humane, generous, and affectionate: his range of thought was wide and lofty, and numerous passages show his exalted and noble aspirations.

He wrote one tragedy at least, the 'Medea,' which is highly commended by Quintilian; and various minor poems are attributed to him, some perhaps without much reason.

The editions of Ovid, of his whole works and of the several poems, are very numerous. One of the best editions of his complete works is by Burmann, 4 vols. 4to., Amsterdam, 1727.

OVIE'DO, a town in Spain, the capital of the province of Asturias, is situated 47 miles N. from Leon, in 43° 19′ N. lat., 5° 57′ W. long., on the Ove, a feeder of the Nora, and has 10,000 inhabitants. The town, which is said to have been founded by Fruela I., the grandson of Pelayo, in 759, although some authorities assert that it existed previously to that time, derives its name from the river Ovia, or Ove, on which it stands. During the middle ages Oviedo was known by the title of Civitas Episcoporum, owing to the great number of bishops, who, being exiled by the Moors, took refuge in this place. Oviedo is the seat of a bishop. It is a neat, clean, well-built town, with several straight and regular streets; the principal of which commence from a handsome plaza or square in the centre of the town, and terminate in alamedas or public walks.

Oviedo contains an episcopal palace, a cathedral, a collegiate church, and several other churches, interesting for their great antiquity; it has also

several convents, and 4 hospitals. The university, a handsome modern structure just outside the town, is well endowed, and contains a numerous and select library. The cathedral is a magnificent structure, of the pure gothic style, equalled perhaps by none in the peninsula. It once contained a rich treasury of valuable vases, relics, and other ornaments, but these were almost entirely lost during the French war. The remains of fourteen kings and queens of Asturias are deposited in one of the chapels. The town is provided with good water by means of an aqueduct. Oviedo has a few tan-yards, and some manufactures of woollen hats, horn combs, buttons, and coarse linen stuffs. It is the seat of an Audiencia real or supreme court, which has jurisdiction over all the Asturias.

(Miñano; Florez, *España Sagrada*, Madrid, 1754; Pons.)

OVIE'DO Y VALDÉS, GONZALO FERNANDEZ DE, was born at Madrid, in 1478. After residing at court for some years as a page, he was made governor of the fort of Santo Domingo in the island of Hispaniola or Hayti, captain of a company of infantry, and historiographer of the Indies. It was in the last capacity that he produced his principal work, 'Historia General de las Indias,' in 50 books, 20 of which, making the first part, were printed, for the first time at Seville in 1535, fol. But Oviedo's most curious work is his 'Quinquagenas,' so entitled from its consisting of 50 dialogues, in which the author is the chief interlocutor. This production contains notices of the principal persons in Spain, their lineage, revenues, and arms, with an inexhaustible fund of private anecdote, all which render it a most valuable addition to the history of that time. This remains in manuscript, in 3 vols. folio, in the national library of Madrid. The time of Oviedo's death is uncertain, but he was alive in December, 1556.

OVI'PAROUS. An animal is said to be oviparous when the ovum, or egg, is excluded from the body entire and hatched after such exclusion. Birds and the great majority of reptiles are oviparous animals.

OVIS. [Sheep.]

OVOVIVI'PAROUS. An animal is said to be ovoviviparous when the egg is hatched within the body and the young one is excluded alive. Thus, among the Reptiles, the young of the Lizard known by the name of *Zooloca vivipara*, the Viper, the Rattlesnake, and the Blind-Worm, are hatched before they are excluded from the body, and not long before such exclusion; indeed it is probable that the rupture of the egg takes place during the parturition. The Monotremes [Echidna and Ornithorhynchus] are examples of ovoviviparous mammiferous quadrupeds.

OVULE, in Botany, is the unimpregnated seed.

OWEN, JOHN, Dr., was born in 1616, at Stadham in Oxfordshire, of which place his father was minister. He took his first degree at Queen's College, Oxford, in 1632; but, after being admitted into holy orders, was obliged to leave the university in consequence of resisting some new regulations made by its chancellor, Archbishop Laud. On the breaking out of the civil war he lost the office which he had for some time held of chaplain to Lord Lovelace, and joined the presbyterian nonconformists. In 1642 he published his first work, 'A Display of Arminianism,' which became the foundation of his future advancement. He was promoted to the living of Fordham, in Essex, which he only enjoyed for a year, being appointed to Coggeshall in the same county. He soon afterwards left the Presbyterian for the Independent party, and gained great distinction for his moderation and tolerant principles. Cromwell, on hearing him preach only once, became so favourably impressed, that he appointed him his chaplain. In 1651 Owen was made Dean of Christchurch, and the following year vice-chancellor of the university of Oxford. On the death of Cromwell he was deprived both of that office and his deanery. After the restoration, refusing all the temptations of Clarendon to induce him to conform, he formed a congregation in London; and in conjunction with Baxter, Bates, and other leading men of his persuasion, instituted the Pinner's Hall Weekly Lecture. He died Aug. 24, 1683. Owen belonged to that section of his party whom Lord Clarendon designates as 'the more learned and rational.' His works are numerous: among them may be mentioned his 'Exposition of the Epistle to the Hebrews;' 'On the Doctrine of Justification,' 1677;' 'The Nature of Indwelling Sin,' 1668.

OWHYHEE. [Sandwich Islands.]

OWL, GREAT HORNED. [Bubo.]

OWLS. [Strigidæ.]

OX. Among the ruminant order of the class Mammalia, the Ox Tribe (genus *Bos*) is in every respect the most conspicuous; and perhaps also the most important as far as the welfare of man is concerned, although it must be confessed that the sheep may claim to divide the palm. Some portions of the genus *Bos* are treated of under the heads Bison and Cattle.

With respect to the organization of the osseous structure, and the peculiarities of the digestive organs in the bovine group, little need be said. The stomach, as in all Ruminants, is complex, and the alimentary canal of great length. The dental formula is as follows:—

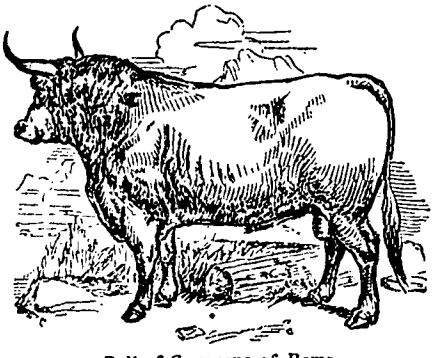
$$\text{Incisors, } \frac{0}{8}\text{; canines, 0; molars } \frac{6-6}{6-6} = 32.$$

It may not however be out of place to give a brief exposition of certain changes which manifest themselves in the incisor teeth of the domestic ox, during the progress of the animal from birth to maturity. The new-born calf has generally two central incisors protruding through the gum more or less developed, and about the close of the 2nd week a tooth on each side of this central pair cuts the gum, making the number four. At the end of the 3rd week the number will be increased to six, and at the end of the 4th week, or thereabout, the number will be increased to eight. These are all deciduous or milk teeth, to be replaced by a permanent series, which is not fairly completed until the 5th year. For a full account of the wearing away and loss of the deciduous incisors,

and of the growth and wearing down of the permanent series, we must refer our readers to the 'Farmers' Library' (article 'Ox,' vol. i., p. 31, et seq.).

In the domestic Ox the period of gestation is 9 months. The normal number is one; though there are not uncommon instances of the cow bringing forth twins, and rare cases of her producing three, and even more, at a birth. In the case of twins, if they be male and female apparently, the apparent female is generally barren, and is called a *Free Martin* (*Taura*, probably of Columella, Varro, and the ancient Romans).

It is a vain attempt (and yet not without its interest) to demonstrate the origin of the domestic races of the Ox. It is true that Europe presents us with fossil remains of oxen from the tertiary series. But will any zoologist point out among these remains the bones of a species palpably identical with the tame race now universally spread? Perhaps the feral race of Chillingham Park,—the Oxen of the Campagna of Italy,—those of the great forest of Portugal, and some of the breeds of Hungary, Poland, and central Europe, generally, are close representatives of a wild race, whence sprung our domestic cattle.



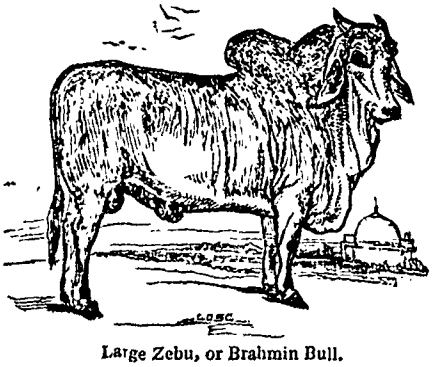
Bull of Campagna of Rome.

But then comes the question,—Did the Zebu races of the East arise from the same stock? If so, greatly have they been modified (and the same observation applies to other breeds of cattle, certain African races for example);—if not, the fertility of a produce between them and the European stock militates against the theory of the non-intermixture of species.

The Zebu race of India may, on a broad survey, be divided into two sorts,—a large and noble breed with high withers, surmounted by a fatty hump, pendulous ears, and a large folded pendulous dewlap.

The smaller breed, seldom exceeding a donkey in stature, is altogether inferior in figure and proportions, and is often hornless.

Small Zebu.



Large Zebu, or Brahmin Bull.

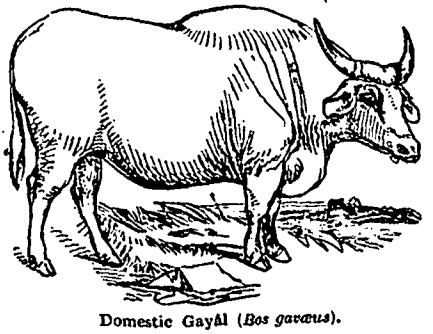
It must not be supposed that there are no truly wild oxen now existing. On the contrary, Asia, Africa, and America (to say nothing of the Bison of Lithuania), have each their respective species. Of the Bison-group, confined as far as it is known to certain districts of Eastern Europe (*Aurochs*) and to North America (*Bison Americanus*), we shall here say nothing, but refer to the article Bison. Passing over these, let us briefly consider what other wild forms are definitely known to naturalists.

India presents us with the Wild Gayâl, Jungly Gau, or Gour (*Bos Gour*, Traill, in 'Edin. Phil. Journal,' Oct. 1824), a gigantic and ferocious animal inhabiting the mountainous districts of Central India, and common on the table-land of Myn-Pât.

Wild Gayâl (*Bos Gour*).

There is in India (in Aracan, Chittagong, Tipura, Silhet, &c.) a domestic or semi-domestic Gayâl or Gyall (*Bos gavæus*, Colebrooke, in 'As. Res.,' vol. vii.; *Bos frontalis*, Lambert, 'Linn. Trans;'

Bœuf des Jongles, Duvaucel; *Bos Silhetanus*, F. Cuvier), which has been confounded with the Gour. We suspect it to be a distinct species, but on this point we refer to the 'Farmers' Library,' vol. i., p. 3.



Domestic Gayâl (*Bos gavæus*).

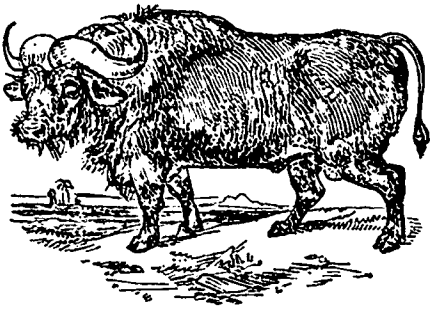
This animal is called *Gabay* by the Hindoos, who will not hunt it, but they hunt and kill another *Gayâl*, as they do the Wild Buffalo.

The Wild Buffalo of India is a strong and savage animal, with huge compressed horns, rising above the head in the form of a bold crescent. This species is called *Urna, Arna, Arni*, or *Arnee* (*Bos Arni*, Kerr), but we doubt whether it be specifically identical with the domestic Buffalo, so common in India and in the East generally, in Africa, and Southern Europe.

The Buffalo, in a domestic or rather semi-domestic state, and valued as a beast of draught and burden, is spread from India throughout Siam, Cochin-China, China, Malacca, Borneo, Java, and Sumatra. Westward, it has been carried into Persia, the Crimea, Turkey, Greece, Spain, and Italy. In Sumatra the Buffalo exists in a wild as well as a reclaimed state, and wild buffaloes are common in the forests of Abyssinia, where they are hunted, their thick hide being used for the manufacture of shields.

In the mountain-chains of Tibet and Bootan, whose summits are clothed with snow, there exists a species of ox, till lately but little known to European naturalists. We allude to the Yak (*Bos grunniens*). This animal is evidently allied to the *Ovibos moschatus* of the high regions of North America. It is wild, sullen, and ferocious; nevertheless the Tartars possess tamed herds of this species, from which they derive milk, butter, flesh, skins, and woolly fur,—the latter being spun and manufactured into various articles of clothing, and into tent-cloths and ropes. These animals are also used as beasts of burden, and though low in stature are very strong and sure-footed. From long antiquity the Tartars have used the flowing tail of the Yak as a sort of standard in battle, and in India it is often mounted on an ivory or silver handle, which elephants of state are taught to wave gracefully in their trunk. For an account of the Yak see Turner's 'Embassy to China,' and Bell's 'Travels in Tartary.' Refer also to the 'Farmers' Library,' vol. i., p. 7, where the characters of the species are fully detailed.

Africa presents us with a peculiar form of the genus *Bos*, remarkable for the tournure of the horns, and the massiveness of their base, which is so developed as to constitute a dense helmet across the forehead. We may notice the Cape Buffalo (*Bos Caffer*) as a typical example.



Cape Buffalo (*Bos Caffer*).

This animal is extremely ferocious, and possesses vast bodily powers. Its eye is savage and lowering; the ears are large, and generally observed to be torn, either from combats among the animals themselves, or from the laceration of spines and thorns as they force their way through the dense thickets. (See Sparrman, Le Vaillant, Dr. Smith, and the works of other travellers in South Africa.)

An allied, but distinct species, is described by Col. H. Smith under the title of *Bos Pegasus*. It is a native of Western Africa. Another species from Central Africa, with short and comparatively feeble horns, and having the large ears covered with shaggy hair, is termed by Mr. Gray *Bos brachyceros*. Several heads of this species are preserved in the British Museum. The wilds of Africa have yet to be explored; it is probable that other species of *Bos*, as yet unknown, are there extant. The transition from Africa to Northern America is abrupt; yet (setting aside the herds descended from the domestic breeds of Europe) we find there two species of Bos, one the Bison, the other a singular animal, with horns not unlike those of the Cape Buffalo, but clothed with full long matted wool, or dense fur. This is the Musk Ox (*Ovibos moschatus*).

Musk Ox (*Ovibos moschatus*).

The subgenus *Ovibos* is thus characterized:—Horns very wide, and touching each other at their base, then applied to the sides of the head, and having the points suddenly turned up. No naked muzzle; but no furrow on the upper lip. Chanfrein narrow at the end, very square, resembling that of the sheep. Ears short. Limbs robust. Tail very short.

This small, powerful, active animal is a tenant of the high latitudes of North America, and the lands of the Esquimaux from the 61st to the 75th degree of latitude. It frequents wild, bleak, and rocky situations, and possesses the agility of the chamois. During the winter it feeds chiefly on lichens, in summer on grass. The flesh is strongly imbued with musk, especially at certain seasons, but at other times it is tolerable, and is eaten both by the Esquimaux and the fur-hunters. (Richardson's 'Fauna Boreali-Americana.')

Fossil Oxen.—Remains of oxen and deer occur abundantly in the third and fourth periods of the tertiary series (*Pliocene* of Lyell), with extinct species of existing genera of *Pachydermata*, such as elephant, rhinoceros, hippopotamus, and horse, and the extinct genus *Mastodon;* and large Carnivora, such as the tiger, hyæna, and bear.

(Professor Owen's *History of British Fossil Mammalia.*)

OXALIC ACID. This acid was discovered by Scheele, in 1776, in the Wood Sorrel (*Oxalis acetosella*), Common Sorrel (*Rumex acetosa*), and other plants. The crystals of oxalic acid are prismatic, colourless, and transparent; the primary form is a right rhombic prism. The taste is extremely sour. The crystals are very poisonous. Oxalic acid, in the anhydrous state, consists of O^3 C^2. The crystals consist of Acid[1], Water[3].

Oxalic acid forms compounds with bases, which are termed Oxalates. The chief of these are the *Oxalate* and *Binoxalate of Ammonia; Oxalate, Binoxalate,* and *Quadroxalate of Potash; Oxalate* and *Binoxalate of Soda;* and *Oxalate of Lime.*

Oxalic Acid is the most highly oxygenated of all the vegetable acids, and is also the most rapidly and certainly fatal of any which are capable of being crystallized. As the crystals are not unlike those of the Sulphate of Magnesia, or Epsom Salts, mistakes between the two are of very frequent occurrence. Being likewise much used in the arts, and commonly known by the name of *Acid of Sugar*, it is taken either accidentally, or under the supposition that it is akin to sugar, and therefore pleasant and innocent.

To counteract the very rapid effects of this poison, the most prompt treatment is necessary. Chalk, magnesia, or even the plaster of the room diffused through water, should be given without delay. Emetics may be given, if vomiting has not spontaneously taken place; but it is highly inexpedient to give much warm water, as dilution only facilitates the absorption of the poison, and induces its remote but equally fatal effects.

OXALIC ÆTHER. [ÆTHER.]

OXALIDA'CEÆ are polypetalous Exogenous plants. The genus *Oxalis* itself is called Wood Sorrel, from the acidity of the leaves and the natural habitation of the European species in a wild state. It is however most common at the Cape of Good Hope, where the species are extremely ornamental.

O'XALIS, a genus of plants belonging to the natural order *Oxalideæ* or *Oxalidaceæ*. *O. acetosella*, Common Wood-Sorrel, is a small perennial plant, having a pleasant acid taste, dependent on the presence of oxalic acid, and is frequently used in salads; its flavour approaches near to that of lemons or tartaric acid, with which its medicinal effects also correspond, as it is esteemed a refrigerant antiscorbutic and diuretic. *O. corniculata*, Horned Wood-Sorrel, is a native of Europe, particularly in Spain, Italy, and Greece. The flowers are yellow; those of the North American plant are larger than the European. *O. stricta* is native of North America, and is naturalised in Cornwall and Devonshire in England. The flowers are yellow and about the size of those of *O. corniculata*. The whole genus of *Oxalis* is curious and beautiful, and well worth cultivation. There are above 220 species described, which are distributed in every quarter of the globe.

OXAMIDE or OXALAMIDE is inodorous, insipid, insoluble in cold water; but boiling water dissolves it, and on cooling, flocculent crystals of a dirty white colour are deposited. When moderately heated, it sublimes unchanged. It consists of O^{16} H^2 C^{12} N^{14}.

OXENSTIERNA, AXEL, COUNT, born in 1583, of a noble Swedish family, studied in Germany at Rostock, Jena, and Wittenberg, in which last university he took degrees. After his return to Sweden, he was made a senator. When Gustavus Adolphus ascended the throne in 1611, he appointed Oxenstierna chancellor or prime minister. From that time the name of the minister is closely connected with that of his illustrious master, to whom his abilities as a statesman were of the greatest service. After the death of Gustavus, in 1632, Oxenstierna became the soul of the Protestant league in Germany. He succeeded in assembling the States of Lower Saxony at Heilbronn, and after much opposition, was himself acknowledged as the head of the league. A succession of able commanders led on the Swedish and German forces, while Oxenstierna directed from Stockholm the diplomatic negotiations, until the peace of Westphalia, in 1648, put an end to the Thirty Years' War. Oxenstierna was at the head of the regency of Sweden during the minority of Queen Christina, and continued to be prime minister after she had assumed the government. He died at Stockholm, in Aug. 1654. He is said to have been partly the writer of the 'Historia Belli Sueco-Germanici,' published by Chemnitz, and also of the work 'De Arcanis Austriacæ Domûs ab Hippolyto à Lapide.'

OXFORD, a city and bishopric, municipal borough, parliamentary borough, and the capital of Oxfordshire, 63 miles N.W. by W. from London by the Great Western Railway, and 54 miles by the road, is situated on the left or N.E. bank of the Isis or Thames, just above the junction of the Cherwell, which flows on the east side of the town. The Isis is divided at and near the town into several channels. The origin of Oxford is

unknown. The name is probably derived from there having been a ford or passage for oxen across the Thames here.

The city, which is irregularly laid out, has been much increased of late years. New streets, elegant houses, both in rows and detached, and a number of smaller tenements, have been erected. The streets are well paved and cleansed, and are lighted with gas. The police and night watch, which are regulated by the university authorities, and maintained at their expense, are very effective. The public buildings, chiefly connected with the university, are numerous, and many of them striking from their magnitude, antiquity, or beauty.

On entering the city on the east side by the London road, over Magdalen Bridge, the buildings of Magdalen College present themselves on the north side of Bridge Street, immediately adjacent to the banks of the Cherwell, and opposite to Magdalen College is the Botanic Garden. Queen's College is in High Street, which is a continuation of Bridge Street. Nearly opposite to Queen's is University College. On the same side of High Street as Queen's is All Souls' College. The opening from the High Street into Radcliffe Square presents numerous edifices of striking character. The eastern side is occupied by All Souls' College, and the buildings of the now extinct Hertford College. On the western side is Brasen-Nose College. Between the eastern and western sides of the opening from High Street are St. Mary's Church, forming the south side of Radcliffe Square, the Radcliffe Library in the centre of the square, and the Schools forming the north side. On the west side of the quadrangle of the Schools is the Bodleian Library. To the north of the Schools is an open square, the north side of which, towards Broad Street, is formed by the Clarendon, formerly a printing-office, a fine building of two stories, 115 feet long, with a Doric portico. The building was erected in 1711, from the designs of Vanbrugh. Near the Clarendon is the Theatre, built by Sir Christopher Wren; it is used for the more public or solemn assemblies of the University, and calculated to hold nearly 4000 persons. The Museum, sometimes distinguished as the Ashmolean Museum, occupies a building adjacent to the Theatre. Not far from the Museum, situated back from the main streets, are Lincoln, Exeter, and Jesus Colleges. On the north side of the town, near the Parks, is Wadham College.

The above-mentioned buildings are arranged according to their locality, proceeding from the London entrance into the centre of the town. The following are near the southern or Abingdon entrance, which is by a bridge over the arms of the Isis. Christ-Church College is on the east side of Fish Street. Near the college is the Cathedral of Christ-Church, which has a central tower. The length is 154 feet, width of the nave and aisles 54 feet, height of the nave 42 feet, and height of the steeple 144 feet. Some antiquaries have ascribed the erection of this church to Ethelred II. (1002 or 1004); others, with better reason, fix the erection in the 12th century.

In the same line of street with Christ-Church College are the churches of St. Aldate, St. Martin, St. Michael, and St. Mary Magdalen, and St. John's College. St. Giles's Church is in the same line of street, near the northern entrance of the town. The Observatory is situated on the west side of the Woodstock Road, not far from St. Giles's Church, and near it is the Infirmary.

The other buildings of Oxford lie back from the principal streets. New College is behind Queen's College and the late Hertford College. Baliol and Trinity Colleges are near St. Mary Magdalen Church, as is also the Martyrs' Memorial, a very beautiful cross erected in 1841. Corpus Christi, Oriel, Merton, and Pembroke College are near Christ-Church College and the cathedral. Worcester College is on the west side of the town. There are, besides the colleges, five halls. Of the churches, the most worthy of notice are St. Mary's and St. Peter's in the East.

There are some remains of Oxford Castle and of the ancient town wall, as well as of the works raised for the defence of the town in the civil war of Charles I. The town and county hall is a spacious stone building; the county-gaol is on the site of the castle, and there is a town-gaol or bridewell. The County Lunatic Asylum is a little way out of Oxford on the south-east. The other chief public buildings are, the University Printing-Office, the University Galleries, and the Taylor Institution. [OXFORD UNIVERSITY.] There are several alms-houses or school-houses, a Catholic chapel, and some places of worship for dissenters.

There are no manufactures of consequence. The prosperity of the city depends mainly on that of the University, and on its being the mart for the surrounding agricultural district. Considerable traffic is carried on, partly by land, partly by the river, or by the Oxford Canal, which here communicates with it.

The municipal borough is divided into 5 wards, and is governed by 10 aldermen and 30 councillors. Population of the city and university, 23,834. The parliamentary borough returns two members: population, 23,656.

OXFORD UNIVERSITY. The origin of the University of Oxford is unknown; but it is certain that Oxford was a place of study in the reign of Edward the Confessor, if not earlier.

The first places of education in Oxford appear to have been schools for the instruction of youth. These schools were either claustral, that is, appendages to convents and other religious houses; or secular, such as were kept by, or hired and rented of, the inhabitants of Oxford. When many of these secular scholars resided in one house, it got the name of Hall or Hostel (terms which are not yet out of use), and governors or principals were appointed to superintend the discipline and the affairs of the house. The schools were divided into grammar-schools, sophistry-schools, schools for arts, medicine or physic schools, law-schools, divinity-schools, &c. It is difficult to discover any traces of a regular plan of education in Oxford before the foundation of the first college by Walter de Merton. The statutes of this founder for his college are well digested:

and they have been adapted with little alteration to succeeding times, in other colleges as well as his.

In the reign of King Stephen, Vacarius, a Lombard by birth, established a school of Roman law at Oxford, which probably subsisted for some time after the death of Vacarius. The pupils of Vacarius were numerous, and as many of them were poor, he prepared for their use (about the year 1149) a work on Roman law in nine books, which was extracted from the Pandects and the Code. The learned John of Salisbury was the friend of Vacarius. (Savigny; 'Geschichte des Römischen Rechts im Mittelalter,' 4ter band; Wenck, 'Magister Vacarius,' Lips., 1820.)

The earliest charter of privileges to the University of Oxford is of the 28th Henry III. It was followed by charters, some of fresh privileges, and others of general confirmation of the privileges formerly granted, in the 39th Henry III., A.D. 1255; in the 18th Edw. III., 1344; in the 17th and 33rd Edw. III.; in the 1st Henry V.; 37th Henry VI.; and 15th Henry VIII. The last confirmation was in the 13th Elizabeth, in the 'Act concerning the several Incorporations of the Universities of Oxford and Cambridge, and the confirmation of the Charters, Liberties, and Privileges granted to either of them.'

This University has been long governed by statutes, or by-laws, made at different times, and confirmed by the charters of the kings of England. Those at present in force were drawn up in 1629, and confirmed by a charter from King Charles I., in 1635. The corporation of the University is styled 'the Chancellor, Masters, and Scholars of the University of Oxford.'

The highest officer is the chancellor. In the 13th century the chancellor was styled the master or rector of the schools. After the reign of Edward III., the chancellor was elected and confirmed by the regents and non-regents only. At first the election was for one, two, or three years; but afterwards for life. Still however the person chosen was a resident member of the University, and always an ecclesiastic until the time of Sir John Mason, in 1553, who was the first lay-chancellor. Since the time of Archbishop Sheldon, in 1667, it has only been conferred upon noblemen of distinction who have been members of the University.

The chancellor's deputy was formerly styled vicegerent or commissary, but for a long time past he has been styled vice-chancellor. His office is annual, though generally held for four years. The vice-chancellor is nominated by the chancellor, on the recommendation of the heads of colleges, and appoints four deputies, or pro-vice-chancellors, who must likewise be heads of colleges. During the vacancy of chancellor however, the office is executed by the senior theologus, or cancellarius notus, resident in the University.

The seneschallus, or high steward, is appointed by the chancellor, and approved by convocation. The office is for life. The high steward assists the chancellor, vice-chancellor, and proctors, in the execution of their respective duties, and defends the rights, customs, and liberties of the University.

The office of proctor is supposed to be coeval with that of chancellor. The duty of the two proctors is to inspect the conduct of the members of the University as to all matters of discipline and good order. They must be masters of arts, of not less than four years' standing, and chosen out of the several colleges by turns, according to a cycle framed in 1629. After their election they nominate four masters of arts to be their deputies, or pro-proctors, and may depute their authority to a larger number if necessary.

The whole business of the University is transacted in two distinct assemblies, termed Houses, namely, the House of Congregation, and the House of Convocation. The chancellor, or vice-chancellor, or, in his absence, one of his four deputies, and the two proctors, or, in their absence, their respective deputies, preside in both houses, where their presence is necessary on all occasions. The business of congregation is principally confined to the passing of graces and dispensations, and to the granting of degrees. The power of convocation extends to all subjects which are connected with the affairs of the University.

There is also an hebdomadal meeting of the heads of houses, who meet every Monday, and at other times when convened by the vice-chancellor. This meeting consists of the vice-chancellor, heads of houses, and proctors, who deliberate upon all matters relating to the privileges of the University, and inquire into and consult respecting the due observances of statutes and customs.

In 1603 King James I., by diploma dated March 12th, granted to the Universities of Oxford and Cambridge the privilege of choosing two representatives in parliament. The members are chosen by the vice-chancellor, doctors, and regent and non-regent masters in convocation.

The following are the colleges of Oxford, with the dates of their respective foundations:—University College, said to have been founded in 872; restored before 1249: Merton, founded at Maldon, in Surrey, in 1264; removed to Oxford, 1274; Exeter, 1314; Oriel, 1326; Queen's College, 1340; New College, 1386; Lincoln, 1427; All Souls, 1437; Magdalen, 1456; Brasen-Nose, 1490; Corpus Christi, 1516; Christ-Church College, 1525; Trinity, 1554; St. John's College, 1555; Jesus College, 1571; Wadham, 1613; Pembroke College, 1624; Worcester, 1714; St. Edmund Hall, soon after 1269; St. Mary Hall, 1333; New Inn Hall, 1392; Magdalen Hall, 1487; St. Alban's Hall, soon after 1547.

The colleges are corporate bodies belonging to the class called eleemosynary [COLLEGIUM], and are quite distinct from the corporation of the University, with which, in the common opinion, they are often confounded.

The buildings belonging to the University of Oxford are:—

1. The *Schools*, with the *Bodleian Library*. [BODLEYAN LIBRARY.]

2. The *Theatre*, built by Gilbert Sheldon, Archbishop of Canterbury and chancellor of the University, in 1669.

3. The *Ashmolean Museum*, built at the charge of the University in 1683.

4. The *Clarendon*, completed in 1712, partly from the profits arising from the sale of Lord Chancellor Clarendon's 'History of the Rebellion,' the copyright of which was given to the University. The basement story of the Clarendon contains at present a police-room, and other apartments connected with that establishment; the remainder of the building is appropriated to offices for the despatch of University business, and lecture-rooms for the professor of experimental philosophy and the readers in mineralogy and geology.

5. *Radcliffe Library.*—The munificent founder of this library was John Radcliffe, M.D., who was born at Wakefield in 1650. By his will, Sept. 13, 1714, he appropriated 40,000*l.* for the building and purchase of the ground on which it stands; 100*l.* per annum for the purchase of books, and 150*l.* per annum for the librarian. Gibbs was the architect. This library was opened April 13, 1749. It has been appropriated by a resolution of the trustees to the reception of books in medicine and natural history.

6. The *Radcliffe Observatory.*—This building was erected out of the funds of Dr. Radcliffe by the trustees of his will.

7. The *University Press.*—As the great increase of business rendered it necessary to have more extensive premises, the delegates of the press were empowered by convocation, in 1825, to contract for the purchase of ground north of Worcester College, for the erection of a new building. The present building was commenced in 1826 by Mr. Daniel Robertson. The entire front and the south wing were finished in 1827; the north, which was commenced in 1829 under the superintendence of Mr. Blore, was completed in the following year.

8. The *University Galleries* were erected partly from a legacy bequeathed by Dr. F. Randolph, and partly from moneys furnished from the funds of the university. They comprise galleries of ancient and modern sculpture.

9. The *Taylor Institution* consists of a spacious library, various lecture-rooms, and apartments for the residence of a librarian. It was erected in pursuance of the will of Sir Robert Taylor, the architect, for the study of modern European languages.

The University Galleries and Taylor Institution were erected in 1842-5, at the angle of Beaumont Street and St. Giles's Street.

Beside these buildings, there is a *Botanic Garden*, containing about five acres, originally the burial ground of the Jews in Oxford. The entrance gateway was designed by Inigo Jones.

The professors of the University are, like those of Cambridge, paid from various sources; some from the University chest, others by the king, or from estates left for that purpose. They are—the regius professors of divinity, civil law, medicine, Hebrew, and Greek, upon the foundation of King Henry VIII.; the Lady Margaret's professor of divinity; the Savilian professors of geometry and astronomy; Dr. White's professor of moral philosophy; the Camden professor of ancient history; Tomline's prælector in anatomy; a professor of music; two professors of Arabic, one of whom is called the Lord Almoner's Reader; a botanical professor; a professor of poetry; a regius professor of modern history and modern languages, founded by King George II. in 1724; an Anglo-Saxon professor; the Vinerian professor of common law; a clinical professor; the Aldrichian professors of anatomy, of the practice of medicine, and of chemistry; a professor of political economy; a professor of Sanscrit; the Taylor Institution professor of modern European languages; Lee's lecturer in anatomy; and readers established by grant from the crown, in experimental philosophy, in mineralogy, and in geology. Several of these professors give no lectures; a circumstance which is explained by the fact of some of the ancient studies of the University having fallen into disuse, civil law for instance; but more particularly in consequence of the practical change which in the course of time has taken place in the system of teaching. The instruction is now given to the undergraduates by their tutors in the respective colleges, and the University merely determines the course of instruction, and superintends and directs the examinations preliminary to the conferring of a degree.

The total number of members upon the books of the different colleges and halls of Oxford, in Jan. 1848, was 6020.

OXFORD, EARL OF. [HARLEY.]

OXFORDSHIRE, a midland county of England, is bounded N.E. by Northamptonshire, E. by Buckinghamshire; S.E., S., and S.W. by Berkshire; W. by Gloucestershire, and N.W. by Warwickshire. Its greatest length N. by W. to S. by E. is 51 miles; its greatest breadth is 32 miles. The area is 756 square miles. The population in 1841, was 161,643.

Surface, Geology, and Rivers.—The southern part of the county is occupied by the Chiltern Hills, which extend across the southern extremity from Buckinghamshire on the east to Berkshire on the south-west. These hills are composed of chalk, and form part of that extensive range of chalky elevations which extends through the counties intervening between Norfolk and Wiltshire, and which incloses on that side the chalk basin of London. The Thames flows through a winding valley or depression traversing this chalk range. The Chilterns were formerly occupied by a forest or thicket of beech trees, which are the trees best adapted to the soil. The chalk-marl, green-sand, gault, iron-sand, oolite, Kimmeridge clay, and lias, appear at the surface in various parts of the county.

Oxfordshire is almost entirely comprehended in the basin of the Thames. The Stour, an affluent of the Warwickshire Avon, rises just within the north-western boundary; and the Ouse, in the upper part of its course, skirts the north-eastern boundary, and receives one of its smaller tributaries from that part of the county; but the districts watered by these streams are too small to require further notice. The Thames, or, as it is sometimes called in the upper part of its course, the Isis, first touches the county a little below Lechlade in Gloucestershire, and leaves the county near

Henley. The Windrush, Evenlode, Cherwell, and Thame, belong chiefly to Oxfordshire.

The Oxford Canal is the only one in this county. The only railway at present (1849) open in the county is a portion of the Great Western.

Agriculture.—The climate of this county is, on the whole, colder than its situation in the central part of the island would lead one to expect. The hilly lands in the north-western part are exposed and bleak; and the influence of the winds is only partially checked by the low stone-walls which form the usual boundaries of the fields. The poorer chalky soils also on the slopes of the Chiltern Hills are late in bringing crops to maturity. But notwithstanding this circumstance, the county may be reckoned amongst the most productive agricultural counties of England; and some of the land is of a quality which can scarcely be surpassed anywhere.

The soil may be divided into four distinct classes—the rich red loam, the stonebrash, the chalky, and the irregular loams; and sands and gravels, which cannot be classed with any of the foregoing.

The red land is partly in old grass, in which state it is very valuable, and partly cultivated as arable land. A great portion of this division was formerly disposed in common fields, and consequently poorly cultivated. The inclosure and division of these lands have, in many cases, doubled their annual produce. A finer tract of land than this red loam is scarcely to be found.

The stonebrash district, which extends from the borders of Gloucestershire across the country to the north of Oxford and Witney, is of inferior fertility to the red land; but it is easily worked, and, having a porous subsoil, is not often injured by rain. The soil is formed of decomposed stone, chiefly chalk and sandstone.

The chalk district is in the south-eastern portion of the county. The chalk is generally covered to a certain depth with a light calcareous loam, evidently produced by the decomposition of the chalk and the mixture of organic matter in a state of decay. The low lands in the valleys through which the rivers flow are in many places covered with the finest herbage, and maintain much cattle.

Besides these distinct soils, there are many of a mixed nature, varying in texture and quality, without any regularity. Where they are incumbent on a porous subsoil, they are mostly fertile.

The course of crops on the light loams is based on the Norfolk rotation, but generally with the addition of an extra crop or two after the wheat, such as beans and oats. In the heavier soils which have been drained, or have a porous subsoil, the convertible system, having half the land in artificial grass and half cropped is preferable; in that case the course is—turnips or other roots, —barley or oats,—clover and grass seeds, to remain three years or more,—wheat,—beans; the beans first, if the soil is heavy, and drilled so as to admit the hoe freely. The manure is given to the turnips abundantly.

Clover and rye grass are usually sown among the barley, either separately or mixed. The rye-grass alone is admirable food in spring for ewes and lambs. The clover is usually mown for hay, and when the two are mixed, the hay is not only more readily made, but the crop is heavier; the rye-grass shoots above the clover plant and interferes very little with its growth. Rye-grass however must not be allowed to form its seeds, for in that case it impoverishes the soil, and the wheat crop suffers in consequence. The cultivation of sainfoin on the chalky loams is one of the great resources of the farmers on such soils. By means of sainfoin many a poor chalky farm has become profitable, and yielded a double and triple rent of what it did before. Its value is fully appreciated in Oxfordshire.

The meadows in this county which lie along the banks of the rivers are productive of excellent herbage; and the hay of some of the upland meadows cannot be surpassed. This may be supposed from the fertile nature of the soil in many places. There are scarcely any irrigated water-meadows.

Divisions and Towns.—Oxfordshire is divided into 14 hundreds. It is in the diocese of Oxford. It is in the Oxford Circuit, and the assizes are held at Oxford. The county returns 3 members to parliament; the city of Oxford, 2; the university of Oxford, 2; and the boroughs of Woodstock and Banbury, 1 each: total 9 members.

The following are the principal towns, with the population of each in 1841:—

Bampton is a small market town, 13 miles W. by S. from Oxford. Population of the township, 778.

Banbury, a market town, municipal borough, and parliamentary borough, 22 miles N. from Oxford, is situated on the west bank of the Cherwell, in the centre of the rich red loam of Oxfordshire; and has the additional advantage of the Oxford Canal running close by the town. The neighbourhood is very thickly covered with villages. Banbury is situated in a valley, almost surrounded by rising ground. Most of the streets are very wide and airy, and are well paved and lighted. The town-hall is modern; the town gaol is an ancient structure. The old church was taken down in 1790, and a new and spacious edifice has since been erected. There are meeting-houses for various denominations of dissenters. The municipal borough is governed by 4 aldermen and 12 councillors: population, 3746. The parliamentary borough, which returns 1 member, comprises the parish of Banbury, which extends into Northamptonshire: population, 7199.

Bicester, a market town, 13 miles N. by E. from Oxford, is neatly built. It derives some advantage from its proximity to the Oxford Canal; but its prosperity chiefly arises from its well-attended market and cattle fairs. The church was built about 1400. It is a neat and commodious structure, with a square tower, and contains some old monuments. Population of the parish, 3022.

Burford, a market town, 18 miles W. by N. from Oxford, is situated on the south bank of the Windrush. The houses of the town are ancient, and, with some exceptions, irregular and ill built. Some of them have fine wooden gables with pan-

nels and hanging tracery. Burford has diminished in wealth and importance from the decay of the coarse woollen manufacture and the malting business, which once flourished there, and from the diminished traffic along the line of road which passes through the town. The church is large; it has a central tower of Norman date, a fine Norman doorway at the west end, and various portions of Norman and early English adjacent to the tower; but the greater part of the church is of perpendicular character and of various dates. Population of the township, 1644.

Chipping-Norton, a market town, 19 miles N.W. from Oxford, is situated near the head of the river Evenlode, on the slope of a considerable eminence. The streets are partially paved. The houses are chiefly of stone, and, though not regularly built, are many of them substantial and even ornamental. The church is a venerable gothic building, with an embattled tower at the west end. There is a town-hall, a free school-house, some dissenting places of worship, and some alms-houses. Population of the township, 2629.

Dorchester, 10 miles S. by E. from Oxford, is situated on the west bank of the Thames. In Saxon times it was a town of importance and the see of a bishopric. It is now a small place, but contains an interesting old church. Population of the parish, 857.

Henley-upon-Thames, a market town, 22 miles S.E. from Oxford, is delightfully situated on a gentle ascent from the west or left bank of the Thames, amid hills covered with extensive beech woods and other plantations. The town consists of four principal streets, well paved and lighted, having a plain stone cross and conduit at their intersection: several of the houses are spacious and handsome. The entrance to the town on the east side is by a handsome stone bridge of five arches over the Thames. The church has a good tower, and several interesting portions both of decorated and perpendicular character. The town-hall in the High Street is supported by sixteen Doric columns, forming a piazza used as a market-house. There are some dissenting places of worship, some alms-houses, and a small theatre. Population of the parish, 3622.

Oxford. [OXFORD.]

Thame, a market town, 12 miles E. from Oxford, is situated on the south bank of the river Thame, an affluent of the Thames. The town consists chiefly of one long and spacious street. The church is a large and handsome building, of early English architecture. Near it are the school-house, a large building, with a fine school-room; and the ruins of the ancient prebendal house of Thame. Population of the parish, 3060.

Watlington, a market town, 13 miles S.E. from Oxford. It consists of narrow streets, irregularly laid out; the houses are mean and ill built, chiefly of brick. The market-house is a substantial brick building. The church, an ancient building, contains some neat monuments. Population of the parish, 1855.

Witney, a market town, 11 miles W. by N. from Oxford, is situated on the banks of the Windrush, chiefly on the western bank. The town is in a pleasant situation, and consists of two principal streets. It contains a 'staple or blanket hall,' a handsome building, erected in 1721; a town-hall, built of stone, with a piazza underneath for a market-house; and a market-cross, built in 1688, and repaired in 1811. The church is a large and handsome cross church, with a tower and a lofty spire at the intersection. Wool-stapling is extensively carried on, and there is a considerable malt-trade. The manufacture of blankets—for which the place has been long celebrated—still continues to flourish. Population of the parish, 5707.

Woodstock, New, a market town, and parliamentary borough, 9 miles N.W. by N. from Oxford, is situated on a rising ground on the east bank of the Glyme, a stream which is expanded into a lake in Blenheim Park. The hamlet of *Old Woodstock* may be considered as forming part of the town, which contains some good streets and houses. The town-hall, a good stone building, was erected in 1766, at the expense of the Duke of Marlborough, after a design by Sir W. Chambers. The greater part of the church was rebuilt in 1785, on the site of a chantry founded by King John, some remains of which still exist. Among the charitable institutions of the place may be mentioned an alms-house, founded by the Duchess of Marlborough in 1793, and erected at her expense. The only manufacture is that of gloves, which, though it has declined of late years, is still carried on to a considerable extent. Population of the parish, 1412; of the parliamentary borough, which returns one member, 7404. Blenheim Park, which contains the magnificent mansion of the Duke of Marlborough, is in the neighbourhood of Woodstock.

History and Antiquities.—The county was probably divided between the two Celtic nations, the Catyeuchlani and the Dobuni; of whom the former held the eastern and the latter the western parts. In the Roman division of the island, Oxfordshire was included in the province of Flavia Cæsariensis. Several ancient British or Roman roads crossed this county, and there are traces of Roman occupation at several places.

In the time of Edward the Confessor, Oxfordshire was included in the earldom of Gurth, the brother of Harold. Of this troubled period there are several memorials in the encampments, which may be traced in different parts of the county.

Of this Anglo-Norman period there are several memorials in the ruins of castles and religious edifices, but none of them of great extent.

The chief ecclesiastical buildings are the churches of Oxford (the cathedral especially), Burford, Henley, Dorchester, and Witney. Of monastic remains there are few, and those not striking. Of Oseney Abbey, once so magnificent, and of Godstow Nunnery, near Oxford, the ruins are small.

In the civil war of Charles I. this county was the scene of several severe contests.

OXUS is the ancient name of the river Amoo or Jihon, which rises in the mountains which form the northern boundary of India, and flows into the Sea of Aral. According to some ancient

writers, it flowed direct into the Caspian; and this statement is said to be confirmed by the existence of its former channel. Herodotus appears to speak of this river under the name of Araxes (i. 201, 202, 205; iv. 11, 40); but his description is confused, and many commentators suppose that the Araxes of Herodotus is the river of the same name in Armenia; while others suppose that it is either the Volga or the Jaxartes. Strabo says that the Oxus rose in the Indian mountains and flowed into the Caspian (Strabo, xi., p. 509, 519); which is also the opinion of Mela (iii. 5) and Ptolemæus. Pliny (vi. 18) makes it rise in a lake called Oxus, and the truth of his statement is now confirmed. [TURKISTAN.]

OXYGEN, an elementary body, the properties of which are best known and most remarkable in its elastic or aëriform state, in which it is termed *Oxygen Gas*. The discovery of this most important substance was made by Dr. Priestley on the 1st of August, 1774, and somewhat later independently by Scheele. To this gas Dr. Priestley gave the name of *dephlogisticated air*, Scheele called it *empyreal air*, and Condorcet *vital air*. Lavoisier gave it the name of *oxygen*, from the Greek words ὀξὺς, *acid*, and the root γεν, to *generate*, because he considered it as the sole cause of acidity; this appellation it still retains, although it is now well known that there are acids which do not contain it, and alkalis which do.

Dr. Priestley first procured this gaseous body by heating the binoxide of mercury in an air-jar, over mercury, by means of a lens, and he afterwards obtained it from other substances. It is now prepared in various ways, according to the purposes to which it is intended to be applied.

Oxygen possesses great power of combination with other elementary bodies, there being scarcely one with which it is not known to combine either by direct union or indirect chemical action. The compounds to which it gives rise by combining, for example, with certain metals, and also indeed with some other bodies, may be classed under the three heads of *Oxides*, *Acids*, and *Alkalis*. There are many bodies which, by a moderate degree of oxidation, become first oxides, and by an increased degree, acids; such substances are charcoal, phosphorus, chromium, &c.

Oxygen Gas is devoid of colour, taste, or smell. It is transparent and invisible. It possesses the mechanical properties of common air. It is capable of being respired, and a given volume of it will support life much longer than an equal bulk of common air. On this account the name of Vital Air was bestowed upon it. It is heavier than atmospheric air, 100 cubic inches at a medium temperature and pressure weighing 34.4 grains, whereas an equal volume of atmospheric air weighs 31 grains. It is but slightly soluble in water, requiring about 27 times its bulk for solution. Light has no effect upon this gas. By heat, like all gaseous bodies, it is merely expanded. Its equivalent, atomic or combining weight, is 8.

The most remarkable property of oxygen gas is the facility and splendour with which bodies, when previously ignited, burn in it. Substances which do not undergo combustion in the air, will readily do so, and with great brilliancy, in oxygen gas. Iron for example burns very readily in it when previously made red-hot.

Until after the discovery of this gas nothing was or could be known respecting the nature of the air, of water, or of earth, all of which, formerly reckoned as elementary bodies, are now known to be compound, and to contain oxygen as one of their constituents. It has also thrown great and unexpected light on the nature of combustion and respiration.

The compounds which oxygen forms with metals and other elementary bodies, are treated of under their respective heads, whether they are oxides, acids, or alkalis.

OXYMURIATIC ACID. [CHLORINE.]

OXY'RIA, a genus of plants belonging to the natural order *Polygoneæ*. *O. reniformis*, Mountain Sorrel, is the only species.

OXYRHYNCHS, a name given by M. Latreille to a great division of Brachyurous Crustaceans, consisting of the *Naiadæ*, the *Oxystomes*, and many of the *Anomura* (Anomoures) of M. Milne Edwards. The latter zoologist however remarks, that as the classification in which the term was employed had been long abandoned even by its author, it was allowable for him (Milne Edwards) to adopt the term, but to apply it to a group of crustaceans, commonly called from the length of their legs *Sea-Spiders*.

M. Milne Edwards divides this family, which embraces a considerable number of genera, into three tribes — *Macropodians*, the *Mians*, or *Maiadæ*, and the *Parthenopians*.

Habits, Food, &c.—The Oxyrhynchs are all essentially marine. None are known to live in fresh-water or to frequent the shores of the sea; but all inhabit great depths, and are generally obtained when dredging for large fish. Their long feet would convey an idea of nimbleness, but these crustacea are in general slow in their motions, and soon die out of water. No swimmers are known among them.

OXYRHYNCHUS, M. Temminck's name for a genus of birds placed by Mr. Swainson in the family *Picidæ*. [WOODPECKERS.]

OXYSTOMES. The *Oxystomes* of M. Milne Edwards form the fourth and last family of Brachyurous Crustaceans (type *Leucosia*), and are divided into the following tribes: — *Leucosians*, *Calappians*, *Corystians*, and *Dorippians*.

OXYU'RUS, Mr. Swainson's name for a genus of birds placed by him under the subfamily *Certhianæ*. The species are natives of South America, and are tree-creepers in their mode of life. Examples, *O. ornatus*, and *O. Australis*.

OYER AND TERMINER. These words in ancient law-French denote a commission which establishes a court of criminal judicature, the distinguishing character of which is described by them. The substance of the commission, or *writ*, as it was anciently called, is an authority given by the king to certain persons to *hear and determine* (oyer et terminer) certain specified offences. The commissions of oyer and terminer are the most comprehensive of the several commissions which constitute the authority of the judges of

assize on the circuits. On these occasions they are usually directed to the lord chancellor, several high officers of state, two judges of the courts of Westminster, the king's counsel, the sergeants-at-law, and the associates; but (excepting on the Northern Circuit, where all the commissioners but one are of the *quorum*) the judges, king's counsel, and serjeants are always of the *quorum*, so that the other commissioners cannot act without the presence of one of them. Justices of oyer and terminer at the assizes have, by the terms of their commissions, jurisdiction to inquire into the truth of all treasons, misprisions of treason, felonies, and misdemeanors, committed within the several counties and places which constitute their circuits, and also to *hear and determine* the same on certain days and at certain places to be appointed by themselves. Besides these ordinary courts of oyer and terminer at the assizes, special commissions of oyer and terminer are sometimes issued upon urgent occasions, where offences of a dangerous tendency have been committed in particular districts, and where the public peace and security require immediate inquiry and punishment.

OYSTERS, or OSTRACEANS, a family of monomyarian conchifers. According to Lamarck, the definition of the family is, 'Ligament interior or demi-interior. Shell irregular and foliated, sometimes papyraceous.'

Lamarck's *Pectinidæ* consisted of the genera, *Pedum, Lima, Plagiostoma, Pecten, Plicatula, Spondylus,* and *Podopsis.*

The Ostraceans of the same author consist of the genera *Gryphæa, Ostrea, Vulsella, Placuna,* and *Anomia.*

Cuvier, under his *Huitres* (*Ostrea,* Linn.), arranges *Ostrea, Gryphæa, Pecten, Lima,* and *Pedum;* and he adds, that the following fossil genera—*Hinnites, Plagiostoma, Pachytes, Dianchora,* and *Podopsis,* might here find a place.

Approximated to the Oysters, although multivalve, should be, in his opinion, the *Anomia* of Brugnière. He then proceeds to *Placuna,* a genus related to *Anomia,* and makes the Thorny Oysters, *Spondylus,* Linn. (with *Plicatula,* Lamarck), follow. To these succeed *Malleus, Vulsella, Perna,* &c.

The *Ostraccans* of M. de Blainville consist of *Anomia, Placuna, Harpax, Ostrea,* and *Gryphæa;* and his *Subostraceans,* of the genera *Ostrea, Spondylus, Plicatula, Hinnites, Pecten, Pedum,* and *Lima.* [PECTINIDÆ.]

OZANAM, JACQUES, was born in the year 1640, at Bouligneux, in the present department of the Ain, and died at Paris, April 3, 1717. He was well known as a mathematical writer, but the only work which has lasted is his collection of Mathematical Recreations, published in 1694, which have been successively enlarged by Montucla and Hutton.

OZARK MOUNTAINS, an extensive mountain region in the United States of North America, west of the Mississippi. They occupy more than half the state of Arkansas, and a considerable portion of the state of Missouri south of the river Missouri. Their northern extremity forms the elevated shores of the Missouri between the mouths of the rivers Osage and Gasconade, where the Missouri begins to run eastward. The mountains extend S.S.E. from the banks of the Missouri to the banks of the Arkansas, which may be considered as breaking through the region. South of the Arkansas a mountainous country extends as far as the Red River. This mountain region extends S.S.W. to N.N.E. from the Red River to the Missouri more than 350 miles. If the country about the upper branches of White River, which is covered with high hills, is considered as a portion of the Ozarks, their width from west to east cannot fall short of 100 miles. Thus the Ozarks cover a surface of rather more than 36,000 square miles, between 90° and 97° W. long. and between 34° and 39° N. lat. They consist chiefly of sandstones.

OZEROV, VLADISLAV ALEXANDROVITCH, a Russian tragic poet, was born in the government of Tver, Sept. 29 (Oct. 11), 1770. After passing through the usual course of military service, in which he rose to the rank of major-general, he exchanged it for a civil appointment, which he held till 1807, when he retired from public life. Although the pieces upon which his fame rests do not amount to more than four, Ozerov may be considered not merely as the reformer, but as in a manner the creator, of Russian tragedy. His 'Œdipus,' 'Fingal,' 'Demetrii Donskoi,' and 'Polyxena,' are all masterpieces, full of poetry; and although simple in plan, with more of dialogue than action, they are strikingly dramatic in some of the situations. He died at the age of 46.

OZONE (from the Greek ὄζω, to smell) is the name given by Professor Schönbein of Basel to an odour evolved during the progress of certain electro-chemical decompositions. It is also produced by common electric sparks, and by the working of an ordinary electrical machine in the air.

Ozone is evolved at the anode, or positive pole of a galvanic battery, at the same time with oxygen, during the electrolisation of any of the following bodies, viz. water, dilute sulphuric acid, solutions of phosphoric and nitric acids, potassa, and many oxysalts. It may also be obtained from atmospheric air, oxygen, nitrogen, hydrogen, carbonic acid, and nitrous oxide, by passing the electrodes through a closely-fitting cork into a jar filled with these gases, and frequently making and breaking contact. Under the influence of heat ozone disappears. Ozone can be preserved for a length of time with the oxygen collected with it in well-closed bottles. Water absorbs it. The inspiration of ozone is very injurious, and the effects similiar to those resulting from chlorine and bromine. A mouse is killed with it in five minutes, and M. Schönbein states that he was seriously affected by breathing an atmosphere charged with it.

So much discrepancy exists in the opinions concerning the nature and origin of ozone, that little can at present be said respecting its position among chemical phenomena.

P is the tenuis or thin letter of the labial series. This letter is interchangeable with those which belong to the same organ, that is the lips, with some others. Thus

1. *P* is convertible with *b*. The *p* in Latin words often becomes a *b* in the related languages. Thus *apicula*, the diminutive of *apis*, a bee, is in French *abeille; septem*, is in German *sieben*. In Latin, the written *b* may have been pronounced as a *p* in the prepositions *ab, sub, ob*, which correspond to the Greek *απο, ὑπο, επι*.

2. *P* with *m*, somewhat rare. [See M.]

3. *P* with *v*. This change is more particularly to be observed in the derivation of French from Latin. Thus from *capillus*, hair, *episcopus*, a bishop, *decipere*, deceive, *Aprilis*, April, the French have *cheveu, évêque, décevoir, Avril*.

4. *P* with *f*. Two or three examples are given under F. To these may be added *pro, for; pater, father; piscis, fish; pauci, few; lupus, wolf*.

5. *P* with *pf*. The latter form is often preferred by the German, where our own tongue has the single letter. Thus the English words *pound, peach, pepper, pea*-cock, *apple*, are written by the Germans, *pfund, pfirsche, pfeffer, pfau, apfel*.

6. *P* with *c, k*, or *q*. [See C.]

7. *Ps* with *sp*. This change it will be more convenient to consider under the letter S.

8. *Pi* before a vowel with *ch*. Thus *sapiam*, in Latin, becomes *sache* in French. The word *roche*, too, was probably formed from a barbarous Latin word *rupia*; and *Rutupium*, in the county of Kent, appears upon this principle to have changed its name to *Rich*-borough.

PAAMU'TO ISLANDS, the native name of the islands which on our charts bear the name of the Dangerous Archipelago. [ARCHIPELAGO, DANGEROUS.]

PACA. [LLAMA.]

PACCHIARO'TTO, JA'COPO, one of the old Sienese painters, was born at Siena in the latter part of the 15th century. In 1535, owing to his being one of the principals in a conspiracy against the government, he was compelled to fly, and took refuge in France, where he in all probability ended his days not very long afterwards. There are still several excellent paintings, both in oil and in fresco, by Pacchiarotto, in Siena; a beautiful altar-piece in San Christoforo; and some excellent frescoes in Santa Caterina and San Bernardino. In Santa Caterina is the visit of St. Catherine of Siena to the body of Santa Agnes of Montepulciano, in which are heads and figures worthy of Raphael. There are two beautiful small easel pictures in oil and on wood in the Pinacothek at Munich—San Francesco d'Assisi, with two angels in the background; and the Madonna and Child, with four angels in the background; half-length figures in both.

PACE (*Passus*), a measure of the Roman system, being their unit of itinerary measure, to which the *mille passus*, or Mile, was referred.

The pace was not, as persons in general suppose, the step, or the distance from heel to heel when the feet are at their utmost ordinary extension; this, which the French metrologists call *pas simple*, was the *gradus* or *gressus*. The passus, or *pas double* of the same writers, was two gradus, or the distance from the point which the heel leaves to that on which it is set down. Assuming the Roman foot at 11.62 English inches, the pace, which was five feet, must have been 58.1 inches or 4.84 English feet.

PACHE'CO, FRANCISCO, was born at Seville in 1571. He studied painting in Seville. He was the first in Seville who painted and gilded statues, and who painted the figures and grounds of bassi-rilievi. There are several works of both descriptions by Pacheco in Seville. It was not till 1611 that he visited Toledo, Madrid, and the Escurial, and there saw the works of Titian and other celebrated masters, Spanish and Italian. Upon his return to Seville he opened a systematic academy of the arts. In 1618 Pacheco was appointed by the Inquisition censor of all the pictures which were exposed for sale in Seville. Nakedness was prohibited, and it was Pacheco's business to see that no pictures of the naked human form were sold. It is to such formal morality as this that the Spanish school of painting owes its characteristic ponderous sobriety.

In 1623 Pacheco again visited Madrid, in company with his distinguished scholar and son-in-law Velazquez, and he remained two years in the Spanish capital. It was at this time that Velazquez painted his equestrian portrait of Philip, upon which Pacheco wrote a sonnet, in which Philip was compared with Alexander, and Velazquez with Apelles.

Pacheco died at Seville in 1654. His works are correct in form, effective in light and shade, studied in composition, and simple in attitude; but they have little colour, and are timid in their handling. His master-piece, the Archangel Michael expelling Satan from Paradise, was in the church of San Alberto at Seville; and there were in Seville many other of his productions, but a great number have disappeared since Marshal Soult and the French army had possession of the town. His 'Arte de Pintura, su Antigüedad, y Grandezas,' 4to., Seville, 1649, is considered an indispensable guide by the painters of the school of Seville.

PACHYCEPHALI'NÆ, Mr. Swainson's name for the Great-Headed Chatterers, part of a family of birds included under the title *Ampelidæ*. [BOMBYCILLA.]

PACHYDE'RMATA (literally *Thick-Hides*, *Dickhäuter* of the Germans, *Pachydermes* of the French), the seventh order of mammiferous quadrupeds according to the system of Cuvier as set forth in his 'Règne Animal.'

The first family of Pachyderms in this arrangement consists of those which have a proboscis and tusks, and which are named *Proboscideans*.

The Proboscideans, in the opinion of Cuvier, have many resemblances to certain Rodents: for instance, their great incisors (so to speak); their jaws, which are often formed of parallel laminæ; the form of many of their bones, &c. The whole of this family have five toes on each foot, completely formed in the skeleton, but so incrusted in the callous skin which surrounds the foot, that there is no appearance of them externally, except as they may be traced by the nails attached to the border of this species of shoe. The canines and incisors, strictly speaking, are wanting; but there are two tusks implanted in the incisive bones, which two tusks project from the mouth, and often grow to an enormous size. The proportions necessary for the alveoli or sockets of these tusks, render the upper jaw so high, and so much shorten the bones of the nose, that the nostrils are found in the skeleton towards the upper part of the face; but, in the living animal, they are prolonged into the well known proboscis, or trunk. The parietes of the cranium contain large spaces for rendering the skull light; and the lower jaw has no incisors. The intestines are voluminous, the stomach simple, and the cæcum enormous. The mammæ, two in number, are situated on the breast; and the young suck with the mouth, and not with the trunk, as some have erroneously supposed. The only living genus of Proboscideans is *Elephas*. [ELEPHANT.]

The other genus is extinct, and consists of the Mastodons. [MASTODON.]

The second family, *The Ordinary Pachyderms*, have either four, three, or two toes.

Those which have the toes equal are in some sort cloven-footed, and, in many respects, approximate to the ruminants in the skeleton and in the complication of the stomach.

Living genera, HIPPOPOTAMUS and *Sus*. [SUIDÆ.] Extinct genus, ANOPLOTHERIUM.

Those which are not cloven-footed form genera which very much resemble each other in the jaws, in having on each side seven upper molars with square crowns and various projecting points, and seven lower ones with a double crescent on the crown, the last of all having a triple crescent; but their incisors are different.

Genera.—RHINOCEROS; HYRAX; PALÆOTHERIUM; LOPHIODON; and TAPIR.

The third family consists of the *Solidungula*, which apparently have but one toe and a single hoof or shoe to each foot, but on each side of the metacarpus and the metatarsus are bony points or processes which represent two lateral toes.

Genus *Equus*. [HORSE.]

To these may be added the following extinct genera:—*Chalicotherium*, allied to the Tapirs; *Chœropotamus*, belonging to the *Suidæ*; *Anthracotherium*, allied to *Chœropotamus* and the *Dichobunes* (*Palæotherium*); *Elasmotherium*, placed by Fischer between *Rhinoceros* and *Hyrax*; *Cœlodonta*, arranged by Meyer between *Rhinoceros* and *Dinotherium*; *Caïnotherium*, placed by Meyer between *Anoplotherium* and *Palæotherium*; and *Adapis* and *Hippotherium*, an animal allied to the horse. *Dinotherium* is considered by Professor Kaup and others to be nearly allied to the *Tapirs*, in which case the extinct animal must doubtless find a place among the *Pachydermata*. [DINOTHERIUM; TAPIR.]

PACIFIC OCEAN, THE, extends between America on the east, and Asia and Australia on the west. It received this name from Magalhaens, the first European who traversed it. It is also called the South Sea, because vessels sailing from Europe can only enter it after a long southerly course. The name of South Sea has been limited in later times to the southern portion of the Pacific.

The Pacific is the greatest expanse of water on the globe, of which it covers more than one half of the surface. The area is roughly estimated at more than 100,000,000 square miles. Behring's Strait, which may be considered as its northern boundary, lies between East Cape in Asia, and Cape Prince of Wales in America, near 66° N. lat., and is less than 40 miles wide. From this point southward, the coasts of both continents, which inclose the Pacific, recede rapidly from one another, and at 54° 30′ N. lat., between the western point of the peninsula of Alashka and Cape Krotzkoi Noss in Kamtchatka, they are upwards of 1200 miles apart. Near the northern tropic, Cape San Lucas in California is about 8500 miles from the coast of China east of Canton; and this may be considered as nearly the average width of the Pacific between the tropics. Near the southern tropic, Sand Cape in Australia is about 8200 miles from the northern coast of Chile. Towards the southern extremity, the Pacific is divided from the Atlantic by a line drawn from Cape Horn to the antarctic pole, and from the Indian Ocean by another line drawn from South-West Cape in Tasmania (Van Diemen's Land) to the same pole.

The Pacific does not, like the Atlantic and Indian Oceans, send off branches, which penetrate deeply into the adjacent continents; but extensive peninsulas project from the continents which border on it, and these, together with some adjacent rows of islands stretching far into the sea, separate considerable portions of it from the main body of the ocean. This is less the case on the American than on the Asiatic side. This peculiarity of formation in the western parts of the Pacific appears to be mainly, if not exclusively, the effect of volcanic agency, when we consider that the peninsulas and islands, which separate the smaller basins from the main body of the sea, are either generally composed of volcanic rocks, or exhibit frequent and unequivocal traces of having been convulsed by subterraneous fire. Active volcanoes

are still very numerous on them, and they form a continuous series which encircles the eastern coast of Asia like a girdle.

Though the Pacific covers more than one half of the surface of the globe, it receives the drainage of a comparatively small portion of the land. In South America the watershed between the rivers which run into the Pacific and the Atlantic is only a few miles from the shores of the former towards the southern extremity of that continent; and thus the Pacific receives hardly more than one twenty-fifth part of the drainage of South America. The area of the countries of North America whose drainage runs to the Pacific, probably does not exceed one-fifth of the whole surface. According to this rough estimate, the Pacific receives not quite one-tenth of the drainage of America. In Asia, the watershed between the rivers which fall into the Arctic Ocean on one side, and into the Pacific on the other, is likewise at no great distance from the latter; and it is supposed that only one-seventh of the drainage of Asia, and one-tenth of that of Australia, flows into the Pacific.

The shores of the continents which are washed by the Pacific are in general high and rocky; in other respects they present every possible shade of diversity. One portion of this ocean is abundantly diversified with islands of various dimensions. This portion lies between the two tropics, and extends from the western boundary of the Pacific eastward to 135° W. long., or over more than half the width of the ocean. To the north of the equator the islands and groups, though numerous, are much less so than to the south of the line. The islands of the Pacific are both low and elevated. The low islands are of very small extent, and are based on coral reefs, which incircle a small space of sea; they are often called *Lagoons*. The volcanic islands are of moderate extent, and generally rise to a great elevation in their centre. The islands which do not belong to the volcanic islands or lagoons are few in number.

The islands of the Pacific are inhabited by two, or, if the large island of Papua is included, by three races of men. Papua contains two different nations, the Papuas and the Haraforas or Alfoërs [PAPUA]; and it is not improbable that these two races are also to be met with on the larger islands east of Papua, as in New Britain and New Ireland. The islands forming the volcanic chain which stretches from Papua eastward, and afterwards inclines to the south-east and south, together with the large island of New Caledonia, are inhabited by a race resembling the negroes, and hence they have obtained the name of Austral negroes. All the islands east and north of the volcanic chain, as well as the large islands, including New Zealand, are inhabited by a race which, in their physical character and in the different dialects spoken by them, strongly resemble the Malays, or inhabitants of the Indian Archipelago.

Before the beginning of the present century, only a few vessels visited the Pacific, and the number has only increased considerably since the independence of South America was established in 1820: our knowledge of those points which more immediately affect the navigation, the winds, and currents, is therefore far from being so complete as that which we possess of the Atlantic in these respects; but it is yearly increasing in amount and importance.

The tracks kept by vessels in navigating a sea are of course determined by the knowledge which the seaman possesses of the direction of the winds and currents. Those of the Pacific are very numerous and varied, owing to the wide range both of latitude and longitude included within its limits.

PACKING PRESS, or HYDRAULIC PRESS. [HYDRAULICS.]

PACTO'LUS. [LYDIA.]

PACU'VIUS, MARCUS, a native of Brundusium, a Latin dramatic poet, and the nephew of Ennius, also distinguished himself as a painter. He was born about 219 B.C., and died in the 90th year of his age. Some of the fragments of the tragedies of Pacuvius are still extant, and in the judgment of Quintilian his plays had merit.

PADANG. [SUMATRA.]

PADDY BIRD. [RICE BIRD.]

PADERBORN. [MINDEN.]

PADILLA, JUAN LOPEZ DE, the leader of a popular insurrection in Castile against the ministers of Charles V., known as *La Guerra de las Comunidades*, was the son of Pedro Lopez, a nobleman who held the high office of Adelantado Mayor of that kingdom. Adrian of Utrecht (who administered the government after the death of Ferdinand V., and before the arrival of the Emperor) and his Flemish associates rendered themselves unpopular by their utter incapacity, their corruption, and their griping avarice. A rising of the people of Toledo was the consequence, whose first act was to seize upon the Alcazar, a royal palace and fortress on an eminence commanding Toledo, and, after appointing Padilla to be their leader, to establish a popular form of government. Segovia, Toro, Salamanca, Murcia, and Avila, followed the example. A general meeting was convened at Avila, and a league formed for the defence of their rights, the direction of affairs being intrusted to a council under the name of Junta de las Comunidades. In the meanwhile Adrian, who resided at Valladolid, sent a body of troops under Ronquillo, to chastise the rebels; but while he was besieging Segovia, Padilla, with a body of insurgents from Toledo, came to the assistance of the citizens, and defeated the royal troops. They then placed Joanna, the mother of Charles V., at the head of the government; and marching upon Valladolid, took possession of the seals and archives of the kingdom. The success of the Comunidades would now have been complete but for dissensions among themselves, and some attempts to destroy the privileges of the nobility, which at once sent that body over to the royalist side. The Junta next became jealous of the popularity of Padilla, and took from him the command of the army, in which he was reinstated too late to contend against the reverses which his party had meantime experienced. In an engagement which took place at Villalar, April 23, 1521, he

was completely defeated, made prisoner, and executed on the following day.

PADILLA, MARIA PACHECO DE, was the wife of Juan de Padilla, whose political principles she embraced, and whose cause she defended. After the execution of her husband, the citizens of Toledo intrusted her with the defence of their rights, and she justified the confidence placed in her. She wrote to the general of the French, who had just invaded Navarre, to advance into Castile, promising him her aid. In order to procure the money requisite for raising an army, she went in person to the cathedral of Toledo, and entering the temple in solemn procession, proceeded to take possession of the vast treasure deposited there. All her efforts were however fruitless. The French were obliged to repass the Pyrenees in haste, and Toledo was invested. Though she defended herself with the greatest courage for four months, the clergy, whom she had highly offended by her spoliations, ceasing to give her their support, she surrendered the fortress, and fled to Portugal, where she passed the remainder of her days.

PADILLA, LORENZO DE, one of the historiographers to Charles V., was born at Antequera, a town of Andalucia, towards the end of the 15th century. He died in 1540, leaving behind him a general history of Spain, divided into four parts, a few sheets of which only have been printed, and of which the original manuscript has disappeared since the end of the 18th century. Florian de Ocampo, Padilla's successor in office, has been accused of using a treatise of this writer on the ancient geography of Spain, in his 'Cronica General de España.' Besides the above works, Padilla wrote 'Libro de las Antigeüdades de España,' afterwards edited by Pellicer, Valencia, 1669, 12mo, and some others yet inedited.

PADLOCK. [LOCK.]

PA'DOVA, *the Province of*, called by the English *Padua*, one of the provinces of the Lombardo-Venetian kingdom, is bounded on the N. by Treviso, on the E. by Venice, on the S. by Rovigo, and on the W. by Vicenza and Verona. The province consists almost entirely of a plain crossed by the rivers Brenta, Bacchiglione, Gorzone, and others, and sloping to the eastward towards the lagoons of Venice. The Adige forms the southern boundary of the province, and divides it from that of Rovigo. The length of the province is about 40 miles from north to south, and its greatest breadth is about 30 miles, but in other places it does not exceed 15 miles. The area is reckoned at 836 square miles. The population is about 300,000. The province of Padova is the most fertile and the most densely peopled of the Venetian provinces which now form part of Austrian Italy. It is divided into 12 districts, which contain 103 communes. A number of canals, some for navigation and others for irrigation, intersect the province, which produces wheat, Indian corn, pulse, oil, wine, flax, hemp, chestnuts, potatoes, fruits, and hay. The other products of the country are live stock, silk, wool, wax, and honey. The manufactories are few, and consist chiefly of tanneries, silk spinneries, woollen cloth, and hats.

The principal towns are the following:—PADOVA; *Este*, a town of about 8000 inhabitants, has given name to an illustrious sovereign family; *Montagnana*, with about 8000 inhabitants, has some tanneries and hat manufactories; *Abano*, with 3000 inhabitants, is noted for its mineral waters; *Battaglia* is also frequented for its mineral springs. Near Battaglia is the village of Arquà, where Petrarch died.

PA'DOVA, in English *Padua*, the chief city of the province, is situated in a fertile plain, in 45° 25′ N. lat., and 11° 55′ E. long. The river Bacchiglione flows by its walls. Padova is fortified with walls, ditches, and bastions, and is above 6 miles in circumference; but it is thinly inhabited, the population not exceeding 47,000. Most of the streets, especially in the old part of the town, are narrow and lined with arcades; it has however some fine squares and handsome gates. The principal buildings are—the cathedral, begun in the 12th century, and having a fine baptistery; the Episcopal palace; the churches of Sant Anthony, Santa Giustina, Santa Croce, the church of the Eremetani, and many others, adorned with fine paintings and sculptures; the university, containing an anatomical theatre, a cabinet of natural history, a botanic garden, an observatory, and a library of 70,000 volumes; several colleges; the palace del Capitanio; the palace Giustiniani, the Caffé Pedrocchi, one of the most splendid coffee and assembly rooms in Europe; and the palace of justice, a vast structure, of which the great hall measures 300 feet long, 100 wide, and 100 high.

The Prato della Valle, or public promenade, is adorned with numerous statues of distinguished Italians.

Patavium was considered in the Roman times as one of the oldest towns of Italy. At the fall of the Roman Empire, it was destroyed by Attila, and the inhabitants removed to the islands in the lagoons, where they founded Venice. Patavium was rebuilt by Narses, ravaged by the Longobards, and restored by Charlemagne. It afterwards governed itself for a long time as a free municipality with its consuls and podestas. In the 13th century Ezzelino da Romano usurped the sovereign power, but after his death the Paduans not only regained their freedom, but extended their authority over several adjacent provinces. Soon after the Carrara became lords of Pádova, until 1406, when Venice took it by force and united it to its territory.

PADOVANINO. [VAROTARI.]

PADSTOW. [CORNWALL.]

PADUA. [PADOVA.]

PADUANI'NO, FRANCESCO, was born in 1552. He was an artist of eminent talents. In the church of the Madonna dei Carmini at Venice there was (and perhaps still is) a picture by him, representing the deliverance of two persons condemned to death, by the interposition of a saint. It is a beautiful performance. As a painter of portraits he was equal to the greatest masters in that branch of the art. He died in 1617, leaving a son, Octavio, who painted in the same style as his father, but was inferior to him in invention.

PÆAN (παιὰν, παιὼν, Ionic παιήων), a hymn

which was originally sung in honour of Apollo, obtained its name from that of the god to whose honour it was sung. The pæan was sung at all the solemn festivals of Apollo. It was a loud and joyous song, and was therefore sung at the cessation of a plague and after a victory. It was also sung by the Greek troops previous to an engagement.

PAEDE'RIA, a genus of plants belonging to the natural order *Cinchonaceæ*. *P. fœtida* is a native of the East Indies, and of Japan and the Moluccas. The leaves have a very offensive smell. *P. ternata* is a native of the East Indies on the mountains which border on Silhet.

PÆDO-BAPTISTS (those who baptise children), a term used by modern theological writers to distinguish those, of whatever sect, who practise infant baptism from the body who are called Baptists.

PÆO'NIA is a genus chiefly of European and Asiatic plants, belonging to the natural order *Ranunculaceæ*, and very generally cultivated in gardens for the sake of their large gaudy flowers. One species, *P. Moutan*, a native of China, is a shrub, of which several varieties, with beautiful whitish flowers stained with pink, are now in our gardens. Of these the most showy is that called *P. papaveracea*, which has a broad crimson stain at the base of each petal.

All these plants are liable to produce double flowers, which, by the conversion of their numerous stamens into petals, are generally extremely beautiful: they have however no smell, or not an agreeable one. Being quite hardy, growing readily in any kind of soil, and easily multiplied, they are generally favourites in gardens.

PAER, FERDINANDO, was born at Parma, in 1774, and received his first instructions in music at the Conservatorio della Pietà, in his native city. After residing some years at Venice, he visited all the great cities of Italy; and then returned to the place of his birth, where the grand-duke, his godfather, settled on him a pension. In 1795 Paer accepted an invitation to Vienna, where he produced three or four operas, and some cantatas for the empress Theresa. In 1801 he succeeded Naumann as kapellmeister at Dresden, and there brought out his 'Leonora' and 'I Fuorusciti.' In 1806 he was taken into the service of the Emperor Napoleon, and appointed composer and conductor of the chamber-music of the empress Marie-Louise. The court favour he enjoyed was not discontinued on the restoration of the Bourbons, and in 1818 he undertook the direction of the Opéra Italien, which office he held till the year 1825. He died at Paris in 1839. Among the many operas by Paer, his 'Agnese,' 'Griselda,' 'Achille,' and 'Sargino,' give him a title to be ranked among the first masters of the age.

PÆSTUM, POSEIDO'NIA, an ancient town of Lucania, about four miles south-east of the mouth of the Silarus, near the coast of the Gulf of Pæstum, now the Gulf of Salerno. The surrounding country, which is low and marshy, lies between the sea and an offset of Mount Alburnus, which divides it from the valley of the Calore, an affluent of the Silarus. The sulphureous springs which are in the neighbourhood form stagnant pools, and a stream which flows past the walls of Pæstum, by overflowing the low grounds, adds to the unwholesomeness of the atmosphere. The whole lowland is deserted, and the only villages are on the hills. The remains of Pæstum are about 25 miles south-south-east of the town of Salerno; they consist of the town walls, two fine Doric temples, another building, and a small amphitheatre. The origin of Pæstum is unknown, but the place was at some early time occupied by a Greek colony, which gave it the name of Poseidonia, or the city of Poseidon. The devices on the medals of Poseidonia, anchors, oars, rudders, show that the people were a sea-faring people. The Romans are said to have sent a colony to Pæstum after the end of the war against Pyrrhus. (Liv. 'Epit.' 14.) It assisted the Romans in their contest against Annibal, and it is mentioned as being at that time a Latin colony. During the middle ages the magnificent remains of Pæstum were little known except to the few who visited them, or to those who saw from the sea those magnificent specimens of ancient architecture. In 1767 appeared at London the first description of Pæstum, 'The Ruins of Pæstum,' folio, with four plates, anonymous; which was followed by Major's work, which had the same title, in 1768. There are other subsequent works on the ruins of Pæstum. The 'Magna Græcia' of Wilkins also contains descriptions and architectural drawings of the temples.

The remains of Pæstum are in the Doric style, and agree, in their general character with other Greek temples, consisting of a cella surrounded by external colonnades. Both of the temples at Pæstum are of this description, being peripteral and hexastyle. The large temple, called that of Neptune, is 195 feet long and 79 wide, and it is *hypæthral*, or open to the sky; that in the cella forms an inner court with a range of seven Doric columns on each side supporting an architrave, on which stands a second range of smaller columns of the same order. The external columns are very massive, being 7 feet in diameter at the base, and 29 feet 10 inches high. The upper diameter below the capital is only 4 feet 9 inches, from which it appears that the shafts decrease very suddenly. The smaller temple, called the temple of Ceres, is 107 feet long by 47 wide; and it differs in several respects from the other and larger temple. The third building was also probably a temple: it has 9 columns at each end, and 18 on the sides, those at the angles being reckoned again. It was divided in its breadth by an internal range of columns in the middle, three of which remain.

PAGAN, BLAISE FRANÇOIS, COMTE DE, distinguished both as a military engineer and a mathematician, was descended from a noble Neapolitan family, and born at Avignon in France, in 1604. He entered the French army very young, and rose rapidly to rank and reputation. At the siege of Montauban he lost his left eye by a musket shot; and, from a distemper contracted in Portugal, he lost the other. He was then only 38 years of age, and being thus incapacitated from

further serving his country in the field, he applied himself to study mathematics together with the theory of a profession which he had already successfully practised. In 1645 he published his 'Traité de Fortifications,' and in 1651 his 'Théorèmes Géométriques.' These were followed, in 1657 and 1658, by a treatise on the planetary theory, and some astronomical tables, all of which were highly esteemed by his contemporaries. He died at Paris in 1665.

PAGA'NI, GREGO'RIO, born at Florence in 1558, was the pupil of Santi Titi and Cigoli, the painters, and became one of the reformers of the Florentine school from the state to which it had been reduced by the blind followers of the anatomical school of Michael Angelo. His masterpiece, the Finding of the Cross by St. Helena, in the Carmine, was burnt in 1771. Few of his works remain; one of the principal is a fresco in Santa Maria Novella. He died at Florence in 1605.

PAGANI'NI, NICOLO, was born at Genoa in 1784. His father initiated him in music, and succeeded so well, that at eight years of age he played the violin in the church, as well as in public saloons. At this period he composed a sonata. After studying under Costa, Rolla, Ghiretti, and Paer, he took an engagement at Lucca, where he received the appointment of director of orchestra to the court. In 1828, after performing in various parts of Italy, he visited Vienna, where he was accused of having murdered his wife, but he refuted the charge. The year 1831 found Paganini in Paris, in which capital he produced an immense sensation. At Brussels however, according to M. Fétis, Paganini's performance at a concert given by him in that city produced only laughter. He arrived in England in the same year, and met with great success; but somewhat endangered his popularity by the enormous prices which he attempted to extort for his performances.

Paganini died at Nice in 1840, of a diseased larynx, leaving an immense fortune to his heirs. His mastery over the violin was almost marvellous, though he made an ignoble use of his power by employing it to captivate the mob of pretended amateurs by feats little better than sleight-of-hand.

PAGE'LLUS, a genus of fishes of the order *Acanthopterygii*, and family *Sparidæ*. Two species occur on our coast, viz. The Spanish Bream (*Pagellus erythrinus*), and the Sea Bream, or Red Gilt-Head (*Pagellus centrodontus*). The young of the latter are called Chads. (Yarrell's *History of British Fishes*, vol. i.)

PAGGI, GIOVANNI BATTISTA, was born at Genoa in 1554. He was the pupil of Luca Cambiaso, and was distinguished chiefly as a painter, but was also a sculptor and architect. Paggi went to Florence in 1580, in consequence of having committed homicide, and remained there until 1600, when he returned to Genoa, and executed several excellent works. His masterpieces are considered two pictures in San Bartolomeo, and the Slaughter of the Innocents belonging to the Doria family, painted in 1606. Paggi died in 1627. In 1607 he published a short treatise on the theory of painting, entitled 'Definizione, o sia Divisione della Pittura.'

PAGO'DA, a corruption of the Sanscrit *Bhagavati*, 'holy house,' is a name generally applied by Europeans to temples in the East, from China to Hindustan. These structures generally consist of a porch, a vestibule or ante-sanctuary for the priests, and an inner sanctuary, containing the principal idol. Some of the Chinese pagodas are elevated upon a terrace, and consist of two stories, the lowermost surrounded by a peristyle of columns. Others are lofty towers in several stories, diminishing in height and width as they ascend. [NANKING.] The name given by the Chinese themselves to such a tower is *Taa*. The Hindoo pagodas are of a pyramidal form. A specimen is shown under HINDUSTAN, vii. 231.

PAGU'RIANS, a tribe of the apterurous section of the anomurous family of crustaceans, composed of a considerable number of species, the greater part of which are remarkable for the more or less complete softness of the abdomen, the want of symmetry in the appendages of this part of the body, the shortness of the two posterior pairs of feet, and many other characters. In the greater number, the abdomen is small, nearly entirely membranous, and partially rolled upon itself; and for the protection of this defenceless part the animal lodges it in the turbinated shell, generally, of some gastropod. The crab is retained in the shell by the aid of the posterior feet, and a pair of crustaceous appendages at the end of the abdomen. In some species it is further fixed by means of certain organs on the lower side of the abdomen. The popular names by which these crustaceans are known in Britain and the West India Islands are Hermit-Crabs and Soldier-Crabs; and in France they are called Bernards l'Hermite. They are held so firmly in the shell of which they have possessed themselves, that they move about with it more or less briskly according to its comparative size or aptitude.

Mr. Broderip, in a paper 'On the Habits and Structure of *Paguri*,' ('Zool. Journ.,' vol. iv.), states, that in pursuing his inquiries upon that subject he had been struck with two beautiful provisions in their animal economy. Their backs are towards the arch of the turbinated shell occupied by them, and their well-armed nippers and first two pair of succeeding feet generally project beyond the mouth of it. The short feet rest upon the polished surface of the columella, and the outer surface of their termination, especially that of the first pair, is in some species most admirably roughshod, to give 'the Soldier' a firm footing when he makes his sortie, or to add to the resistance of the crustaceous holders at the end of his abdomen or tail, when he is attacked and wishes to withdraw into his castle. On passing the finger downwards over the termination of these feet, they feel *smooth*; but, if the finger be passed upwards, the roughness is instantly perceived. The same sort of structure (it is as rough as a file) is to be seen in the smaller caudal holders. The second provision he observed in a very fine and large species of *Pagurus* from the Mauritius (*Pagurus guttatus* of Olivier, he is

inclined to believe). Two specimens (now in the British Museum) were in his possession, one of which is housed in a very large young shell of *Pteroceras truncatum*, the other (nearly a foot long) is naked, and on examining the under side of the abdomen or tail of this specimen, a great number of transverse rows of acetabula were to be seen, even without the aid of a glass. Dr. Bright has another naked specimen, in which the same formation, which must very much assist the hold of the Pagurus, is visible.

The Pagurians are all more or less terrestrial in their habits; and some have been known to travel to a considerable distance from the sea.

The genera included under this head are *Pagurus* (Example, *P. Bernardus*, common on our coast); *Cenobita* (Example, *Cenobita Diogenes*. Locality, the Antilles); *Cancellus* (Example, *Cancellus Typus*); and *Birgus* [BIRGUS].

PAIMBŒUF. [LOIRE-INFÉRIEURE.]

PAINE, THOMAS, was born Jan. 29, 1737, at Thetford, in Norfolk. His father was a Quaker. At the age of twenty he removed to London, where he worked some time at his father's business, which was that of a staymaker. He then went to Sandwich in Kent, where, in 1760, he married the daughter of an exciseman, and obtained a place in the Excise, but retained it only about a year, and then became an assistant at a school in the neighbourhood of London. After leaving this situation he was again employed in the Excise, and was stationed at Lewes in Sussex. Here he had gained some reputation by various pieces of poetry, and had been selected by the excisemen of the neighbourhood to draw up the 'Case of the Officers of Excise; with Remarks on the Qualifications of Officers, and on the numerous Evils arising to the Revenue from the Insufficiency of the present Salaries,' 1772. The ability displayed in this his first prose composition induced one of the Commissioners of Excise to give him a letter of introduction to Benjamin Franklin, then in London as a deputy from the colonies of North America to the British government. Franklin advised him to go to America. He took the advice, and having settled himself at Philadelphia in 1774, became a contributor to various periodical works, and in January, 1775, editor of the 'Philadelphia Magazine.' In January, 1776, he published in America his 'Common Sense,' for which the legislature of Pennsylvania voted him 500*l.*; the university of the same province conferred on him the degree of M.A., and he was elected a member of the American Philosophical Society. He was also made Clerk to the Committee of Foreign Affairs. During the American War he published at intervals fifteen numbers of 'The Crisis' (Philadelphia, 1776-1783), a series of political appeals intended to rouse and keep alive the public spirit.

In 1781 Paine was sent to France with Colonel Lawrence to negociate a loan, in which he was successful beyond all anticipation. He was appointed, in 1785, Clerk to the Assembly of Pennsylvania; he received from Congress a donation of 3000 dollars; and the state of New York bestowed on him the confiscated estate of Frederic Davoe, a royalist, near New Rochelle, in the state of New York, consisting of 500 acres of well-cultivated land, with a good stone house.

After the peace between Great Britain and America, Paine seems to have employed himself chiefly in mechanical speculations, especially the construction of iron bridges. The first part of his 'Rights of Man,' in reply to Burke's 'Reflections on the French Revolution,' was published at London, in 1791; and the second part early in 1792. An information was laid by the attorney-general against him as the author of the second part, which was designated as 'a false, scandalous, malicious, and seditious libel;' and the trial came on in the court of King's Bench before Lord Kenyon. He was eloquently defended by Lord Erskine, then the Hon. Thomas Erskine, but the jury, without suffering the attorney-general to reply, at once pronounced him guilty. In the meantime Paine had been chosen by the department of Calais as a member of the French National Convention, in which he took his seat in 1792, and offended the Jacobins by voting that the king should be imprisoned during the war, and banished afterwards. He published his 'Reasons for wishing to preserve the life of Louis Capet, as delivered to the National Convention.' Towards the end of 1793 he was excluded from the Convention as a foreigner, though he had been naturalised; and in 1794 was arrested by order of Robespierre, and committed as a prisoner to the Luxembourg.

He had finished the first part of his 'Age of Reason' just before his imprisonment: it was published at Paris under the auspices of his friend Joel Barlow. The second part was completed during his confinement; and it was published at Paris in 1795, after the author had been set at liberty on the fall of Robespierre. When the English publisher of this work was prosecuted in 1797, Erskine appeared for the prosecution, and a verdict of guilty was again pronounced. Bishop Watson's 'Apology for the Bible, in a series of Letters to Thomas Paine,' appeared in 1796.

On his liberation Paine had asserted his right to sit as a member of the Convention; and on the 8th of December, 1794, he was allowed to resume his place. In the course of 1795 he published at Paris 'A Dissertation on the First Principles of Government;' 'The Decline and Fall of the English System of Finance;' and 'Agrarian Justice, opposed to Agrarian Law and to Agrarian Monopoly.'

Paine returned to America in 1802. His first wife had died about a year after their marriage; he lived about three years with his second, when they separated by mutual consent. During his last residence in France he had become intimate with Madame Bonneville, the wife of a French bookseller, who, with her two sons, accompanied him to America. After his return he published four or five treatises on iron bridges, the yellow fever, on the building of ships of war, &c. He died on the 8th of June, 1809, and was buried in a field on his own estate near New Rochelle.

Paine, from his first starting in public life, was

a republican, uniformly consistent and apparently sincere. His style is vigorous and clear, but somewhat coarse; though simple, it is enlivened with comparisons and illustrations which render it very popular and attractive. He saw clearly the weak points of any object against which he directed his attack, and accordingly he was a vigorous assailant; but he was not qualified, either by competent knowledge or by habits of patient investigation, for examining any subject in all its bearings. His 'Age of Reason' alienated from him his friends in America as well as in England, and excited feelings of the deepest disgust and abhorrence in the whole Christian community of both countries.

PAINSWICK. [GLOUCESTERSHIRE.]

PAINTING is that art of design which imitates objects by colour on a uniform surface.

Ancient Egyptian paintings, executed on the walls of their tombs, represent subjects of every class — battles, triumphal procession, operations of agriculture, and scenes of domestic life. There are specimens in the British Museum. The wooden cases of the mummies are remarkable for the brilliancy of their colours.

The origin of the art in Greece is ascribed to Corinth or Sicyon; but the name of the supposed inventor, as recorded by Pliny, is evidently deserving of little attention.

From B.C. 580 to 460, painting advanced considerably in Greece. Historical pictures of very early events are recorded; one indeed by Bularchus in the reign of Candaules, who died B.C. 716. Cimon of Cleonæ invented 'Catagrapha,' that is, figures seen obliquely from above or below, and thus applied the rules of perspective. The peculiarities of drawing at this period are best learned from the study of the ancient vases; the forms and protuberance of the muscles are exaggerated, and the positions strained and whimsical.

Polygnótus of Thasos, who probably settled at Athens about B.C. 463, was the first painter of great excellence, and the founder of what may be called the Athenian School.

At Rome, C. Fabius Pictor is said to have derived his name from decorating the temple of Health (B.C. 304). The poet Pacuvius (B.C. 219–140) was an artist. The victory of L. Scipio over Antiochus (B.C. 190) was recorded by a picture in the Capitol, as that of M. Valerius Messala over Hiero had been by an historical painting in the Curia Hostilia (B.C. 264). The first foreign picture publicly exhibited at Rome was after the sack of Corinth by Mummius (B.C. 146), an event which brought many of the finest works of art to the conquering city, however little the victors were qualified to appreciate their real worth.

The four colours which were the basis of the colouring of the ancients down to the time of Apelles were—1, white, Melian earth, or, more rarely, cerussa (white lead); 2, red, rubrica from Cappadocia, called sinopis; 3, yellow, sil, ἄχρα, from the Attic silver mines; 4, blacks (probably including blues), atramenta, μέλαν, from burnt plants or ivory. These were the 'colores austeri,' to which were afterwards added the brighter and more expensive colours, 'floridi,' which were usually furnished to the painter by his employer. Vermilion (cinnabar) was called minium by the Romans. What we call minium (red lead) was by them termed 'cerussa usta.'

Italian Schools.—Very little trace of Christian art is discernible before the time of Constantine, the earliest professors of Christianity having abstained from the use of images and the practice of the art of painting. In the early Christian works we do not trace that gradual attempt to improve the technical part of painting which is apparent among the Greeks and in the middle ages. A certain tendency to emblems and allegory is peculiarly visible. The first representation of Christ is in the character of the Good Shepherd, as mentioned by Tertullian ('De Pudicitiâ,' cap. 10). The walls of the catacombs of Rome and Naples displayed stories from the Old Testament as types of Christ in far greater number than direct representations or scenes from the New Testament. In the fifth century the erection of sumptuous basilicas gave occasion for a great display of mosaic. At Byzantium, the empty form of art, as of everything else, continued in all its pomp. Great mechanical skill in the use of gilding, joined to an anxious and spiritless imitation of older forms misunderstood, long continued to characterise this school, from which the church paintings of the modern Russians and Greeks are directly derived.

It is probable that the conquest of Constantinople by the Latins, in 1204, supplied to the Italians some of that technical skill which the wild conflicts of their own parties at home had contributed to obliterate. This event was followed in a short time by the rise of the *School of Siena*. In San Domenico of Siena is a picture by Guido of Siena, dated 1221, in which the face of the Virgin shows traces of the type which afterwards characterised that school, which is distinguished by its rigid adherence to old types and forms; while the *School of Florence* directed attention more to real life, and gave to it that practical tendency which suited the active and commercial spirit of the republic. Reference to the works of Cimabue, Giotto di Bondone, Taddeo di Gaddo, Angelo Gaddi, Andrea di Cione, Duccio di Buoninsegna, Simone di Martino, Lippi di Memmi, Ambrogio di Lorenzo, &c., enable us to judge of the excellence of both the Sienese and Florentine Schools previous to the 15th century.

At the beginning of the 15th century a fresh impulse was given to Florentine art through the advances made in sculpture by Lorenzo Ghiberti, Donatello, and Luca della Robbia. The groundwork was thus secured for profiting by the genius of the two great men, Fra Angelico da *Fiesole* and Masaccio, who supplied respectively the finest feeling for the gentle and devotional affections, and a power of drawing and composition, joined with the requisite relief by light and shade. Accordingly the *School of Florence* began to produce masters of first-rate excellence. Nevertheless the progress of what may be called the executive part of painting, amid the bustle of a prosperous city like Florence, implies some sacrifice of the higher and purer feeling, such as had characterised the school of Siena,

and had attained perfection in the works of Fra Angelico.

The seeds of that devotional simplicity which were afterwards destined to unite with the greatest technical excellence in the works of Raphael, seem to have sprung up in Umbria. In this district the enthusiastic tone of the order of St. Francis, and the prolonged influence of some of the Sienese masters, probably paved the way for the feeling which pervades the works of Pietro Vanucci della Pieve, or Pietro Perugino, as he is commonly called. Art now made rapid advances in Italy; and at the end of the 15th century, from the schools of Ghirlandaio, Verocchio, Perugino, and Bellini, were bursting forth Michael Angelo, Leonardo da Vinci, Raphael, Giorgione, and Titian. In the eagerness with which Leonardo da Vinci explored the anatomical and scientific ground-work of his art, he anticipated M. Angelo, as he rivalled him in the varied application of his genius. It is in Leonardo that we first recognise a thorough feeling for the roundness of objects, and a greater breadth and simplicity in the masses of light and shade. Raphael stood alone in his peculiar walk of art. No master ever rivalled the tenderness and sweetness of his female forms, or surpassed the power shown in his larger works. The difference between his best pictures and those of other painters is one of kind rather than of degree, and the quantity which he produced in a short life is as remarkable as the fact that scarcely one of his works can be called ordinary in expression or careless in execution. In his Madonnas he enhanced the simple beauty and pure feeling of the *Umbrian School*. In his frescoes he rivalled the grandeur of Buonarotti, and in his portraits he surpassed the truth and individuality of Titian or Vandyke. The pupils and imitators of Raphael were numerous, and his influence upon art was very great.

To turn to the north of Italy, Antonio Allegri, or, from his birth-place, Correggio (born 1494, died 1534), probably was instructed in the school of Mantegna, but after the death of Andrea. Nothing in the history of art seems so premature as the style of Correggio. His expression, to say the least of it, often borders on affectation. His early picture at Dresden shows the same colouring which he afterwards carried to such perfection. No other artist ever played with light and shadow as he was wont to do. His half tones and his reflected lights produce the effect of illusion. He knew his power, and delighted in displaying it in the conquest of difficulties from which other masters shrank.

The *Roman School* had cultivated beauty of form and composition, Correggio perfected chiaroscuro, and it was in the *Venetian School* that colouring attained its highest perfection. We possess in England good specimens of Titian's works, especially in the National, the Bridgewater, and Fitzwilliam Galleries (at Cambridge). The brilliancy of his high lights and the ruddy transparency of the skin in his flesh are most marvellous; his large compositions, which, like most of his countrymen, he executed in oil instead of fresco, must be seen at Venice. It is impossible

to conceive more delicious landscapes than those of his back-grounds, or more reality than animates his portraits. Jacopo Robusti (Tintoretto) and Paul Veronese were also among the most distinguished of the Venetian school of this period.

Towards the end of the 16th century art seemed destined to decline. Venice was in some degree an exception; but at Florence exaggerated anatomical display, the attitudes of academic models, and hard opaque colour are the characteristics of many of those masters who thought they were following M. Angelo. But the reaction from the Reformation which pervaded the Roman church began to be felt in the arts also. The Jesuits were fast recovering the ground lost in what may be called the heathen days of the papacy. Palestrina spiritualised the music of the church, and the Caraccis to a certain extent revived the sister art of painting.

The founder of the *Bolognese School* was Ludovico Caracci (b. 1555, d. 1619), who was a pupil of Prospero Fontana and Tintoretto. His nephews Annibale and Agostino zealously seconded his efforts, and they opened an academy at Bologna. The study of the antique and of nature was united to the endeavour to appropriate the characteristic excellence of each most distinguished master—a principle from which they derived the name of the Eclectic School, and which of itself can lead to little. They succeeded however in elevating the character of painting far above that which it bore in the hands of their immediate predecessors, and joined earnestness and devotional feeling to great technical excellence. This school gave birth to a large number of masters. Another Eclectic School, that of the Procaccini, arose at Milan, which produced, among other masters, Gio. Batista Crespi and his son Daniele Crespi.

Opposed to the Eclectic Schools were those masters who seemed to have imagined that a true imitation of nature consisted in appropriating to every and any subject the first forms which came in their way, instead of selecting such as thoroughly suited the conception of the particular scene to be treated, and imitating those as closely as possible —too closely it cannot be. The vague notion of the ideal on the one hand and of indiscriminately copying vulgar nature on the other, are opposite and equally fatal errors. The leader of the 'Naturalists' was M. Angelo Amerighi da Caravaggio (b. 1569, d. 1609), whose force of execution was very great, and who often rose to real pathos in his expression. Among his scholars were two Frenchmen, Valentin and Vouet. At Naples, where the Naturalists opposed in the most violent manner all incroachments of the other school, Giuseppe Ribera, or Lo Spagnoletto, has left in San Martino a masterly Descent from the Cross. Salvator Rosa (b. 1515, d. 1673) was a man of most varied powers. His landscapes (often wild scenes in the Apennines) and his battle-pieces are best known, and superior to his historical pictures. Luca Giordano, surnamed 'Fa Presto' may be considered as closing the 17th century. In the 18th century Antonio Canale and his nephew Bernardo Bellotto, or Canaletto, executed those well-known views which have

never been exceeded for truth and out-door effect.

Northern Schools.—Illuminated MSS. still remain as monuments of German art in the 9th and 10th centuries. The marriage of Otho II. (978–983) with the Greek princess Theophania probably gave the German artists access to the technical skill of the Byzantines. Towards the end of the 12th and beginning of the 13th centuries visible signs of new life in art begin to show themselves. Towards the close of the 14th century the school of Cologne was most distinguished. Meister Wilhelm is spoken of by a contemporary chronicler, in 1380, as the best master of his day. No connection has been traced between the German and old Flemish masters, though such probably existed. Hubert and John van Eyck (b. 1366, d. 1426, and b. 1400, and d. 1445) united the majestic simplicity of the old Christian type with a close imitation of external nature and a homely strength characteristic of their country. The school of Van Eyck was fertile in good painters; among them were Gerard van Meeren, Hugo van der Goes (some of whose pictures are to be found in Italy), Roger van Brügge, and more especially his pupil Hans Hemling, or Memling. Towards the close of the 15th century we find a kindred school to that of Flanders existing at Cologne; and the same feeling may be traced in the engravings and pictures of Martin Schoen, or Schöngauer of Colmar, who painted about 1460. Hans Holbein the elder, of Augsburg, worked about 1500, but it was at Nürnberg that the German school displayed its full power. Michael Wohlgemuth, of that city (b. 1434, d. 1539), was the master of Albert Dürer (b. 1471, d. 1528), a painter who scarcely shrinks from comparison with any of his great Italian contemporaries.

In looking at the general character of the old German masters, we see a vigour of conception and power of technical execution equal to any exhibited by the Italians; but they are the 'Romantic' school contrasted with the 'Classic.' Their works are deficient in independence and genuine feeling, although they interest us as being the ground-work of the school of Rubens.

Towards the commencement of the 17th century Rubens (b. 1577, d. 1640) caused a revival of painting in the Spanish Netherlands, more striking perhaps than that effected by the Caracci. Rubens was equally great in history, landscape, and portrait. To complain that the fire of his genius was not chastened as in the great Italian masters, is to wish that the artist had been a different individual from what he was formed to be. When we look at Rubens's works, their facility of execution, their energy, and their brilliancy, hurry us beyond such considerations. When we think of them, we may regret that his forms are often ill-selected, and that the brute animal vigour of his bacchanals is pushed to coarseness. Rubens had many followers, of whom Van Dyck was the most celebrated.

In Holland, at the commencement of the 17th century, Mirevelt and Franz Hals painted history and portraits with success. But the great master of the Dutch School was Rembrandt (b. 1606, d. 1674). His peculiar power consisted in the mastery of light and shade. He has had numerous pupils and imitators. There have been a great number of masters in Holland who belong to a class distinguished in what is called *Genre*. Theirs is the popular side of everyday life in art, as contrasted with the epic grandeur of historical works, or the enthusiasm of devotional art. In this department Breughel, Teniers, and Ostade, are conspicuous names. In a more refined department of *genre*, Terburg and Gerard Dow stand pre-eminent.

The great Italian painters Giorgione and Titian were admirable in landscape. Annibale Caracci and Domenichino have left excellent pictures in this department. But as if the ugliness of the country stimulated its natives to study all the aids which make an ordinary scene picturesque, it was in Flanders and in Holland that landscape painting was most cultivated. John Breughel, or 'Velvet-Breughel' (b. 1569, d. 1625), copied with wonderful minuteness all the variety of vegetation. Contemporary with Annibale Caracci, there lived at Rome a Flemish artist, Paul Bril, who forms a sort of link between the landscape painters of the north and south.

In that kind of landscape, the excellence of which consists in grandeur and the form of the large masses, Nicolas Poussin led the way. He was followed by Gaspar Dughet, or Poussin (b. 1600, d. 1663), and Sebastian Bourdon (b. 1616, d. 1671). Claude Gelée was a native of Lorraine (b. 1600, d. 1682); he was first educated by A. Tassi, a scholar of P. Bril, but nature, and nature alone, taught him to tinge his graceful forms of foliage, and his rippling water with the cool pearly hue of morning or the rich glow of an Italian evening.

The style of Claude reacted on the Low Countries. Hermann Swanevelt, John Both, and Adam Pynacker, were painters of the same character, and they had numerous followers.

In pastoral landscape, Nicolas Berghem (b. 1624, d. 1683), Albert Cuyp (b. 1600), Carl du Jardin (b. 1640, d. 1678), and Adrian van der Velde (b. 1639, d. 1672), excelled. Philip Wouvermans (b. 1620, d. 1668) pursued a line peculiar almost to himself, or in which at least he has no rival. He executed battles, fairs, halts of cavalry, and all scenes in which horses occur, with exquisite truth and delicacy.

The most eminent marine painters were Bonaventura Peters (b. 1614, d. 1652), Ludolf Backhuysen (b. 1631, d. 1709), and William van der Velde (b. 1610, d. 1693). Franz Snyders (b. 1579, d. 1654), John Fyt (b. 1625, d. 1700), and John Weenix (b. 1644, d. 1719), painted animals. The first of the three executed large hunting-pieces in conjunction with Rubens.

Spanish School. — The Flemish masters, as might be expected, seem to have exercised an early influence in Spain, especially two, known as Maestro Rogel (1445) and Juan Flamenco (1496), who are supposed by some to have been Roger van Brügge, a pupil of J. van Eyck, and John Hemling. Antonio del Rincon (b. 1446, d. 1500), Alonso Berruguete (*b.* 1480, d. 1562), Pedro

Campaña, a Fleming by birth (b. 1503, d. 1580), Luis de Vargas (b. 1502, d. 1568), and Vicente Joanes of Valencia (b. 1523, d. 1579), were the earlier Spanish masters of eminence who studied in Italy. In the school of Seville, in the 17th century, the principal forerunners of Murillo were Juan de las Roelas, the two Herreras, and Francisco Zurbaran. Bartolomé Esteban Murillo (b. 1618, d. 1682) has left early pictures at Seville which give little promise of his subsequent excellence. It was only after his return from Madrid, in 1645, that he attained that freedom and power which characterise his best works. The name of Murillo is supposed in this country to stand highest in the Spanish school, but we are of opinion that Diego Velasquez de Silva (b. 1599, d. 1660) was the greater man of the two. His portraits are inimitable: his historical works in the Madrid Gallery, such as the Surrender of Breda, and his sketches of landscape in the same collection, are of great excellence. One of his most celebrated early pictures is the Water-Carrier, now at Apsley House, London. Alonso Cano of Granada (b. 1600, d. 1667) painted with a fine feeling of simplicity and beauty. Francisco Ribalta (b. 1551, d. 1628) is generally held to be the best master of the Valencian school. The altar-piece in the chapel of Magdalen College Oxford, is probably by him. Claudio Coello (d. 1693) is one of the last Spanish masters who deserve notice. His picture in the sacristy of the Escurial is a first-rate work.

French School.—Leonardo, Andrea del Sarto, Rosso, and Primaticcio, were among the Italians whom the zeal of Francis I. introduced into France; but we find little independent existence of French painting before Simon Vouet (b. 1582, d. 1641), who studied the later Venetian painters and Caravaggio: his contemporary, N. Poussin (b. 1594, d. 1665), stamped a character on the art of his country which may be said to have lasted to our own days. Of Gaspar Poussin and Claude we have already spoken. Le Sueur, Mignard, and Le Brun, were pupils of Vouet. Watteau and Vernet executed some beautiful landscapes. In later times, Jacques Louis David (b. 1748, d. 1825) carried out on a larger scale the principles of Poussin. It is impossible to deny his pictures the merit of fine drawing and a certain power; but disagreeable colour, exaggerated theatrical expression, and academic affectation, mar the effect of their better qualities. His most eminent followers were Gérard, Gros, Girodet, Guérin, and Géricault.

English School.—Except the portrait-painters, Dobson, Oliver, and Cooper, in the reign of Charles I., we cannot name an English artist of any eminence until we arrive at Hogarth (b. 1697, d. 1764); for his father-in-law, Sir James Thornhill, hardly deserves notice. Boydell's 'Shakspere Gallery' certainly roused a feeling for art, and contributed to the spirit which prevailed in England at the end of the last century. Sir Joshua Reynolds (b. 1723, d. 1792) still remains the first on the list of English portrait-painters. His historical pictures are of very inferior merit. George Romney (b. 1734, d. 1802) has left some works which almost rival Reynolds. The earlier works of Benjamin West (b. 1738, d. 1820) make us feel the more strongly the mannered uniformity and coldness of his later pictures. James Barry (b. 1741, d. 1806) had at least the merit of daring to undertake a work of the greatest magnitude. John Opie (b. 1761, d. 1807) was one of our most powerful masters, and certainly superior to Northcote. Wilson (b. 1754, d. 1782) and Gainsborough (b. 1727, d. 1788) must be looked on as the founders of the English school of landscape-painting. We cannot but lament that the Raphaelesque purity of Stothard's early designs was afterwards exchanged for the prettinesses of Watteau. It is impossible to deny poetical imagination and grandeur to Fuseli, though these qualities are obscured by overcharged and mannered drawing. Sir Thomas Lawrence executed portraits inferior only to those of Reynolds. Haydon tried in vain to render large historical pictures popular. Subjects of domestic interest, such as those in which Wilkie so peculiarly excelled, and landscapes, of which those of Calcott are distinguished for truth of imitation and chasteness of colouring, have of late years greatly risen in public estimation. Of living artists it is unnecessary to speak.

PAINTING, ENAMEL. [ENAMEL.]

PAINTING, HOUSE, is the art of painting the interior and exterior of dwellings and other buildings with a composition which shall preserve from decay, please the eye, and render the surfaces to which it is applied less liable to soil, and easier to be cleaned. It is executed either in oil or distemper.

In oil the principal tools employed are brushes, made of hogs' bristles for large surfaces, and sash tools made of finer hair for small work, as mouldings, window-bars, &c. White lead is used for white colour; it is also the basis of all ordinary colours. The colouring substances (*stainers*) in general use are earths, umber, ochre, Siena, Venetian red, purple, brown, &c. The first three are sometimes burnt, a process which reddens and darkens them. Metallic compounds are red lead, vermillion, Prussian blue, chrome yellow, verdigris, Brunswick green, verditer, &c. Animal and vegetable colours are lakes, indigo, ivory black, and lamp-black. The liquids in use are linseed oil (sometimes boiled with litharge to render it drying, and hence called *boiled oil*), and oil or spirits of turpentine, called *turps*. These are combined for use in various proportions, according to circumstances: when the paint is required to bear a gloss, or is intended for outside work, most oil is used; and for black, chocolate colour, green, &c., outside, boiled oil alone, or with a very little turps, is best. For flatting, which has no gloss, turps alone is requisite. To all paint a little sugar of lead, or litharge, is added to make it dry quick.

In painting in distemper, the brushes for large surfaces differ from those used in oil: they are wider and flatter, and are termed distemper-brushes; but the tools for small work are similar. Whiting takes the same place in this branch that white lead holds in oil; the colouring sub-

stances are similar, but ground in water, and the fluids are water and melted size.

PAISIELLO, GIOVANNI, was born at Tarento, in 1741, and entered in the Jesuits' College of that city, where he manifested so strong a disposition for music, that his father, an eminent veterinary surgeon in the service of Charles III., was prevailed on to place his son in the Conservatorio St. Onofrio at Naples. He there produced, among other compositions, a comic interlude, which, in 1763, procured for him an order to compose an opera for the Teatro di Marsigli at Bologna. In 1776 he entered into the service of Catherine II., and continued in Russia nine years, where he composed several operas, among which was his 'Barbiere di Siviglia;' also an oratorio, 'Il Passione,' and many sonatas, &c. He afterwards produced at Vienna, at the desire of Joseph II., 'Il Re Teodoro,' and 'La Molinara;' and for the same monarch wrote 12 symphonies. On his return to Naples the king appointed him his Maestro di Capella, and settled on him a pension of 1200 ducats. He composed for the King's Theatre, London, 'La Locanda,' which opera was subsequently performed at Naples under the title of 'Il Fanatico in Berlina.' The Revolution at Naples, in 1799, gave to that country a republican government, under which Paisiello accepted the office of National Director of Music; but at the restoration of the royal family, he was suspended from all his public functions. In about two years however he was reinstated. Shortly after this he accepted an invitation from Bonaparte to visit Paris. Besides a high salary, he was here offered various high and profitable appointments, but declined them all except that of Maître de Chapelle to the head of the government. In Paris he produced 13 masses, motets, &c., a 'Te Deum' for Napoleon's coronation, and an opera, 'Proserpine,' for the Académie de Musique. In about two years and a half Paisiello returned to Naples for the benefit of his health. A second revolution at Naples placed Joseph Bonaparte on the throne of that kingdom, who confirmed Paisiello in all his appointments; and the French emperor made him a chevalier of the legion of honour, with a stipend of 1000 francs. He was also elected an associate of the French Institute. He died at Naples in 1816.

PAISLEY, a municipal borough and parliamentary borough, in Renfrewshire, Scotland, is situated on both banks of the White Cart, about three miles above the junction of that river with the Clyde, in 55° 48′ N. lat., and 4° 26′ W. long. It is 43 miles W. by S. from Edinburgh, direct distance, and seven miles E.S.E. from Glasgow by the Glasgow, Paisley, and Ayr Railway.

In the time of Agricola, the Romans had a station on the site of Paisley. In 1160 a priory was founded on the eastern bank of the White Cart. In 1219 Pope Honorius issued a bull which raised the priory to an abbacy. A small town arose on the opposite bank of the river, which James IV. in 1488 erected into a burgh of barony, under the superiority of the abbot of Paisley.

The town of Paisley, in the early part of the last century, was solely on the west bank of the river, and it then consisted merely of one principal street and a few straggling lanes. It is now the third town of Scotland in population and commercial importance. The houses are far less handsome than those either of Edinburgh or Glasgow. Low thatched roofs are not uncommon even in some of the principal streets, particularly in the old town, but they are diminishing in number every year.

The nave of the old abbey church is all that remains of the ancient monastery. It was carefully repaired in the latter part of the last century, and is now used as a parish-church. The style is chiefly gothic. The other churches of the establishment are, the High Church (built in 1756), the Middle Church (1781), and St. George's (1819). Besides these, there are a great many other places of worship. Paisley is a presbytery within the synod of Glasgow and Ayr. The burgh and new town are united by three stone bridges, each of two arches. Between two of these, the old and Sneddon bridges, and on the western bank, is situated the castle or county-hall, a fine stone-building erected in 1818, and comprising a court-house, council-chamber, and other offices, a debtor's prison, another for criminals, together with a bridewell and chapel.

Under the act 3 & 4 Wm. IV., c. 77, the magistracy consists of 16 councillors, including a provost, 4 baillies, and a treasurer, one-third of whom retire from office annually. The ancient boundaries of the burgh are far more restricted than the present parliamentary and municipal boundaries, which include about six square miles, and comprise a large agricultural district. By means of a short canal and improvements in the bed of the river, the Cart is now navigable up to the town for vessels of from 60 to 80 tons' burthen. The Glasgow, Paisley, and Ardrossan Canal, crosses the Cart by an aqueduct bridge on the southern side of the town. A railway extends from the town to a station on the left bank of the Clyde, a little above the mouth of the Cart; and a branch of the Forth and Clyde Canal terminates nearly opposite to this station.

In 1707 the principal articles made in the town were coarse linen, chequered cloths, and Bengals, to which succeeded chequered linen handkerchiefs, and goods of a lighter texture, such as lawns. About 1725 the machinery for making white sewing or ounce thread was introduced from Holland. About 1760 the manufacture of silk gauze was introduced upon the plan practised by the Spitalfields houses, and, during the greater part of the following 30 years, was carried on upon a very extensive scale. The reduction in the cost of cotton goods, consequent upon the invention of Arkwright's spinning-machinery, lessened the demand for silken fabrics, the manufacture of which at Paisley has since then greatly declined.

Many of the principal establishments of Paisley are now exclusively engaged in the various branches of the cotton manufacture, among which the muslin branch may be particularly mentioned as that of which Paisley is regarded as the chief seat. A considerable portion of the yarn used in

making the finer qualities of muslins is imported from Lancashire. Crape dresses and damask and embroidered shawls are also manufactured to a great extent. There are also brass and iron foundries, breweries, distilleries, bleach-fields, &c.

Since the passing of the Scotch Reform Act in 1832, Paisley has returned one member to the British parliament. The population of the parliamentary borough in 1841 was 47,695. The population of the municipal borough was 48,426.

PAJOU, AUGUSTIN, born at Paris in 1730, obtained the grand prize for sculpture in the French Academy in 1748, and went as a pensioner of the French government to Rome, where he remained 12 years. Gabet mentions that Pajou was the sculptor of about 200 works, in bronze, marble, stone, wood, and even in paper or pasteboard. He executed the sculptures of the façade of the Palais-Royal, ordered by Louis XVI.; the sculptures of the Salle de l'Opera at Versailles; the ornaments of the Palais Bourbon; and of the Cathedral of Orleans; the Naiades of the south and west faces of the Fontaine des Innocens at Paris; and also several classical groups, and statues of celebrated men. He died at Paris in 1809. He was made one of the professors of the French Academy of Arts in 1767; and subsequently a member of the French Institute.

PALACE, a word adopted into all European languages from the Latin *Palatium*, the name given by Augustus to his residence on the Mons Palatinus at Rome. In its stricter meaning it is restricted to a royal abode, but is occasionally applied to any sumptuous habitation. In Italy the term Palazzo, taken by itself, is used for any large mansion or noblemen's house; and palaces of this class constitute, after churches, the principal architectural features of Genoa, Florence, Rome, Milan, Vicenza, Venice, and other cities, to which they impart an air of grandeur which is wanting in the street architecture of this country.

PALACE COURT. Under MARSHALSEA will be found a statement of the nature of this court. A recent act however, the 12 and 13 Vict. c. 101, s. 13, has abolished the Court of Marshalsea, the Palace Court, and the Court for the Honour of Peveril. No new suits are to be commenced in in any of these courts after the passing of the act (Aug. 1, 1849). Suits pending on Dec. 31, 1849, are to be transferred to the Courts of Common Pleas at Westminster, or to the county courts; and all the powers of the said three courts are then to cease and determine. The records of the said courts are to be transferred to the custody of the master of the rolls.

PALÆONISCUS, a remarkable genus of heterocercal fossil fishes, constituted by M. Agassiz, and included by him in the first family (*Lepidoïdei*) of his great order of Ganoidean fishes. Of the genus *Palæoniscus* twenty species are described, from the coal formation, from the zechstein of Germany, from the magnesian limestone, and also from the carboniferous limestone.

PALÆOSAURUS, the name given by Dr. Riley and Mr. Samuel Stutchbury to a genus of fossil Saurians discovered in the magnesian conglomerate on Durdham Down, near Bristol (1834).

The conglomerate wherein the Saurian remains were found rests upon the edge of inclined strata of mountain limestone, filling up the irregularities of their surface, and consists of angular fragments of the limestone cemented by a dolomitic paste. The thickness of the deposit where the remains were discovered does not exceed twenty feet.

Three animals were found, two belonging to the genus *Palæosaurus*, and the other to a genus named by them *Thecodontosaurus*.

PALÆOTHERIUM. In the gypsum quarries near Paris, and in various parts of France, the fossil relics of a group of pachydermatous animals have been discovered, to which Cuvier gave the title of *Palæotherium*. Ten or eleven species are recognised, varying from the size of a rhinoceros to that of a hog. The most immediate alliance of these extinct fossil forms is to the Tapir; perhaps they take an intermediate station between that animal and the rhinoceros. The bones of the nose prove that the *Palæotheria* must have been furnished with a short proboscis. The toes were three on each foot. The dentition is as follows:—

$$\text{Incisors, } \frac{6}{6}; \quad \text{Canines, } \frac{1-1}{1-1}; \quad \text{Molars, } \frac{7-7}{7-7} = 44.$$

The relics of the *Palæotherium* [ANOPLOTHERIUM; LOPHIODON] are found mingled with those of many other extinct forms, in a stratum of freshwater formation, as is evidenced by the shells it contains; it is the first of the great fresh-water formations of the Eocene period of Lyell, a deposit in which nearly fifty extinct species were discovered by Cuvier. We cannot doubt but that the Palæotherium frequented the borders of lakes and large rivers, feeding upon the leaves and twigs of brushwood. In such localities their dead carcasses might easily have been carried by floods into the lake or river; there the bones would sink, become imbedded in the mud, in due time be fossilised, and rest till disinterred, to attest the changes which our planet has undergone.

The remains of *Palæotheria* have been found in the tertiary formation near Rome, and also in the marly beds and quarries of Binstead, in the Isle of Wight, which belong to the lower freshwater formation.

(See Cuvier's *Ossemens Fossiles;* Dr. Buckland's *Bridgewater Treatise;* the *Geol. Proc.*, 1830; and Professor Owen in *Geol. Trans.*, 2nd Series, vol. iii., p. 451; and in the *History of British Fossil Quadrupeds.*)

PALÆOZOIC SERIES. The fossiliferous strata of earlier geological date than the carboniferous system and the mountain limestone are thus designated. Recent researches into the organization of the fossil plants and animals of those ancient strata have produced very strong evidence for believing that, from the Snowdonian slates, placed by Professor Sedgwick in the lower part of the Cambrian system, to the lower beds of the old red-sandstone (at least), one system of organic life prevails—characterised by the preponderance of corals, such as Catenipora and Favosites, shells of Brachipoda and Cephalopoda, and crustacea of the trilobitic types. On the con-

trary, if we compare the whole series of organic forms found in these Palæozoic strata, as they are exhibited in Wales or Cumberland, with the whole series of fossils discovered in the carboniferous system of the north of England or the border of Wales, we find not more than 1, 2, or 3 per cent. of intimately-related species. The distinction between the Silurian fossils and those of the mountain limestone is of the same order as that which obtains between the latter series and the fossils of the magnesian limestone. At present the Palæozoic series of rocks includes the following formations:—Old Red-sandstone, the Silurian Rocks, and the Cambrian Rocks.

PALÆ'PHATUS. Four Greek writers of this name are mentioned by Suidas. A work has come down to us under the name of Palæphatus, in one book divided into fifty short chapters, entitled 'On Things Incredible.' The author explains, according to his fashion, the origin of the mythical fables, such as the Centaurs, Pasiphae, Actæon, &c., to which he attributes an historical foundation disguised or corrupted by ignorance or love of the marvellous. The best edition of the text is that of Fischer, Leipzig, 1789.

PALÆSTRA (παλαίστρα), which properly means a school for wrestling, was used in several different significations. The word first occurs in Herodotus (vi. 126, 128), who informs us that Clisthenes built at Sicyon a dromos and palæstra, both of which he calls by the general name of gymnasia. At Athens however it appears probable that the palæstræ and gymnasia were distinct places, and that the former were appropriated to the gymnastic exercises of the boys and youths, while the latter were intended for those of the men.

Among the Romans the terms Palæstra and Gymnasium are used as synonomous.

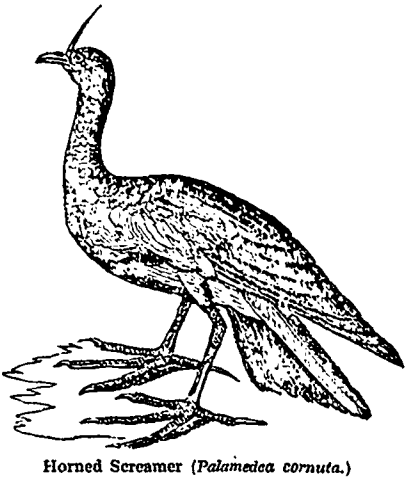
PALAIS. [Belle-Ile-en-Mer.]

PALAME'DEA (Linnæus), a genus of birds placed by Mr. Vigors among the Grallatores, with its congeners *Parra*, *Chauna*, *Rallus*, and *Fulica*, in the family *Rallidæ*. The same author thinks that with *Parra* may be allied *Palamedea*, Linn., and *Chauna*, Illiger (the *Parra chavaria* of the 'Systema Naturæ'), both of which seem to approach Parra in affinity, although the latter of them is so imperfectly known, that its situation cannot be decided with certainty. ('Linn. Trans.' vol. xiv.

To us it appears that *Palamedea*, *Chauna*, and a few other genera, constitute a natural family of the grallatorial order, as distinct from the *Rallidæ* as are the Cranes (*Gruidæ*).

Genus *Palamedea*. Bill shorter than the head, covered at the base with small feathers, conico-convex, slightly vaulted, hooked at the point. Forehead armed with a cylindrical horn, which is pointed. Nostrils oval, open. Wings spurred, third and fourth quills longest. Anterior toes united at the base by a membrane; hallux touching the ground at the end.

Example.—*Palamedea cornuta*, the Horned Screamer. It is larger than a common goose. It is greenish-brown above, except on the middle of the neck, which is variegated with black and white, and a large cinnamon-coloured spot on the shoulders; abdomen whitish; a long-spear-shaped horn projects from the forehead; wings long and pointed; tail wide and square; tarsi slender and reticulated, as well as the toes, which are long and almost entirely free; claw of the hallux nearly straight and very sharp; two spurs implanted on the edge of the wing.



Horned Screamer (*Palamedea cornuta.*)

This extraordinary bird lives in the marshy or inundated places of South America (Guiana and Brazil), which it makes resound with its wild and loud cry. Its food consists of grains and aquatic herbs, as its muscular stomach would indicate, though there are not wanting those who state that it hunts reptiles. It pairs, and lives faithfully with its mate.

A second species, the *Chaïa*, or Chaja (*P. chavaria*), is separated by Illiger into a distinct genus, termed by him *Chauna*. It is a native of Paraguay and Brazil. The head is simply crested.

D'Azara has given us many interesting particulars relating to this bird. Its sharp, clarion-like cry is exerted not only during the day, but also in the night, if it hears any noise. The note of the male is expressed by the word Chaja, and that of the female (for they answer each other) by the word Chajali. They are seen sometimes singly, sometimes in pairs, and at other times in numerous flocks. They principally, indeed ordinarily, frequent marshes, and if they are at any time found on the banks of rivers, it is in places where the water is low and runs sluggishly. They do not swim, but enter the water like Herons, not however in search of fish or frogs, but for the leaves and seeds of aquatic plants on which they live.

D'Azara saw some brought up among the domestic poultry at country-houses, and they were as tame as fowls. Those who kept them told him that the Chaïa ate bits of raw meat, but he saw them picking the grass. They perch on the tops of the highest trees. On the ground they walk with gravity. Some state that the nests are spacious, and formed of small branches on bushes surrounded with water, and others that the bird

places it in the rushes in the midst of the water. The eggs are laid in the beginning of August, and the young, which are two in number, follow their parents, though they are only clothed with down.

PALANQUIN, a kind of covered litter, carried, by means of poles, upon the shoulders of men, which forms the principal vehicle for personal transport in Hindustan.

PALATE is the partition which separates the cavity of the mouth from that of the nose, forming the roof of the one and the floor of the other. In man it is composed of two portions, which are called respectively the hard and the soft palate: the former is made up of the inferior or palatine processes of each superior maxillary bone and palate bone, which, meeting in the middle line of the body, form a somewhat flattened arch over the mouth; the latter consists of a membranous curtain of muscular and cellular tissue, of which one margin is attached to the posterior border of the hard palate, and the other, with the uvula appended to its middle, hangs loosely backwards into the cavity of the pharynx.

The hard palate serves as a firm support against which the food may be pressed by the back of the tongue during mastication. The soft palate is capable of such motions by the contractions of its muscles, that it can either be raised so as to close the passage from the pharynx to the nose and Eustachian tube, or be depressed so as (with the assistance of the tongue) to close the passage from the pharynx to the mouth, or even to close both those apertures.

PALATINATE, THE. There were formerly two states in Germany of this name, which, till 1620, were under one sovereign: they were not contiguous, and were called, by way of distinction, the Upper Palatinate and the Lower Palatinate. The Lower Palatinate was called likewise the County Palatine of the Rhine, or the Palatinate of the Rhine.

The Upper Palatinate was bounded by Bayreuth, Bohemia, Neuburg, Bavaria, and the territory of Nürnberg. It now belongs to Bavaria.

The Lower Palatinate was situated on both sides of the Rhine, and was bounded by Katzenelnbogen, Würtemberg, Baden, Alsace, Lorraine, and Treves. The chief cities were Mannheim and Heidelberg.

It is hardly necessary to trace the history of a country which, after having undergone numerous changes, is now divided among different German sovereigns, and the very name of which has disappeared from the maps of Germany.

PALATINE COUNTIES. Three English counties, Chester, Lancaster, and Durham, are counties palatine. Pembroke, in Wales, was also a county palatine; but its palatine jurisdiction was taken away by 27 Henry VIII., c. 26.

Counts palatine were of feudal origin. Selden says 'the name was received here doubtless out of the use of the empire of France, and in the like notions as it had in that use' ('Titles of Honour,' part 2).

The counts palatine in England had jura regalia within their counties, subject only to the king's general superiority as suzerain. They had each a Chancery and Court of Common Pleas; they appointed their judges and magistrates and law officers; they pardoned treasons, murders, and felonies; all writs and judicial proceedings issued and were carried on in their names. Many of these powers, such as the appointment of judges and magistrates, and the privilege of pardoning, were abolished by 27 Henry VIII., cap. 24, which also provided that all writs and process in counties palatine should from that time bear the king's name. The statute however expressly stipulates that writs shall be always witnessed in the name of the count palatine.

The county of Chester is a county palatine by prescription, being commonly supposed to have been first given with regal jurisdiction by William I. to Hugh d'Avranches. It was annexed to the crown, by letters patent, in the reign of Henry III., and since that time it has always given the title of Earl of Chester to the king's eldest son, and is preserved in the crown as a county palatine when there is no Prince of Wales.

The county of Lancaster appears to have been first made a county palatine by Edward III., who in the 25th year of his reign, in his patent of creation of Henry the first duke, granted him the dignity of a count palatine, and afterwards, in the 50th year of his reign, granted the same dignity by letters patent to his son John, Duke of Lancaster. Henry IV. was Duke of Lancaster by inheritance from his father John of Gaunt, at the time of his usurpation. Upon the attainder of his grandson Henry VI., soon after the accession of Edward IV., the duchy became forfeited to the crown, and an act of parliament passed to incorporate the county palatine with the duchy of Lancaster, and to vest the whole in Edward IV. and his heirs for ever. Another act of parliament passed in the reign of Henry VII., confirming the duchy to the king and his heirs for ever, and from that time it has been united to the crown.

Durham is a county palatine by prescription. Durham continued as a county palatine in the hands of a subject till the year 1836, the bishop having been prince palatine, and possessing jura regalia till that time. By the stat. 6 & 7 Will. IV., c. 19, the palatine jurisdiction was separated from the bishopric and transferred to William IV., and vested in him and his successors as a franchise separate from the crown, together with all forfeitures, mines, and jura regalia. The jurisdiction of the courts was expressly excepted from the operation of the act.

PALAWAN. [Sooloo Archipelago.]

PALEMBANG. [Sumatra.]

PALENCIA, a province formed out of the eastern part of the kingdom of Leon in Spain, lies to the south of the Biscayan province of Santander, and W. of the province of Burgos in Castilla la Vieja. The area is 1726 miles, and the population about 148,491. The north of the province is covered by the southern slopes of the Asturian or Cantabrian mountains; the rest of the surface is tolerably level; the south-west district is covered by the table-land of Cabezos. The province is included in the basin of the Duero it

is drained by the Sequillo and Pisuerga, and their feeders. There is a lake of considerable size called *Nava*, near the right bank of the Pisuerga, and a few miles W. by N. from the city of Palencia. The province is traversed by the Canal of Castilla y Campos, which commences at Alar-del Rey in the province of Burgos; it was intended to connect Reynosa with Segovia, but terminates at Paredes-de-Nava. The soil is good and well watered, but bare of trees, which are seen only on the mountains. The climate is cold and healthy. Wheat, barley, oats, pulse, middling wine, fruits, flax, hemp, and madder, are the chief products. The inhabitants use straw, dung, and vine-cuttings for fuel. Pasture is good, and horses, mules, sheep, goats, and hogs are numerous. Copper, chalk, gypsum, and saltpetre are found. The manufactures, which are of little consequence, consist of coarse woollen stuffs, linen, canvass, hats, paper, pottery, and leather.

The chief town Palencia (the ancient *Pallantia*) is situated in a fertile plain on the left bank of the Carrion, which is a feeder of the Pisuerga and is crossed at this place by two bridges. The town contains several churches and convents built in the Gothic style; the most remarkable building is the cathedral of San-Antolin. The inhabitants, who number 11,000, manufacture woollen cloths and blankets. Palencia gives title to a bishop, and is 65 miles S.E. from Leon. It was at Palencia that the marriage of the Cid to Ximena Gomez was celebrated. *Torquemada*, N.E. of Palencia on the right bank of the Pisuerga, which is here crossed by a fine bridge of 26 arches, has about 2500 inhabitants, who trade in brandy, wine, and wine-skins. *Saldaña*, on the left of the Carrion, over which there is a bridge of 23 arches, is a small town of under 2000 inhabitants. *Paredes-de-Nava*, 15 miles N.W. from Palencia, is situated at the foot of a range of low hills, on the lake of Nava, and near the canal before mentioned, and has 5500 inhabitants. The town is ill built and ill paved. *Carrion*, N. by W. from Palencia, stands on the left bank of the Carrion, in a rich corn district, and has about 3000 inhabitants. Close to the town are the remains of a splendid Benedictine convent.

(Miñano, *Diccionario Geografico.*)

PALENCIA, ALONSO DE, royal historiographer to Ferdinand and Isabella of Spain, was born in 1423. The time of his death is uncertain; but he seems to have lived to a good old age. The most popular of Palencia's writings are his 'Chronicle of Henry IV.' and his Latin 'Decades,' containing the reign of Isabella down to the taking of Baza from the Moors in 1489. Besides the two above-mentioned works he wrote 'El Universal Vocabulario en Latin y Romance,' Sev., 1495; 'Los Libros de Flavio Josepho,' 1491; 'Las Vidas de Plutarco, 1508; 'El Espejo de la Cruz,' 1485; and several other works still in Manuscript.

PALERMO, *Intendenza* or *Province of*, extends along the western part of the northern coast of Sicily, and is bounded on the east by the province of Messina, on the west by that of Trapani, and on the south by the provinces of Girgenti and Calatanisetta. Its area is reckoned at 1790 square miles. The province of Palermo is divided into the four districts of Palermo, Corleone, Termini, and Cefalù, and according to the last census contained 465,169 inhabitants. Its chief streams are the Termini, the Fiume Torto, and the Fiume Grande between Termini and Cefalù. The principal towns are:—PALERMO. *Termini*, a town of 15,000 inhabitants, with a harbour, a castle, and an old cathedral. *Cefalù*, a town of 8000 inhabitants, built on the sea-coast at the foot of a high cliff, with a handsome collegiate church. *Corleone*, an inland town, with 13,000 inhabitants, chiefly employed in agriculture. *Monreale*, with 13,000 inhabitants, and a splendid Benedictine abbey. *Carini*, the ancient Hyccara, with 6000 inhabitants. *Piani dei Greci*, an Epirote colony, with about 5000 inhabitants and a Greek church.

The small island of Ustica, about 30 miles from the coast, contains about 1200 inhabitants.

PALERMO, the capital of the island of Sicily, is situated on the northern coast of Sicily, in 38° 7′ N. lat., and 13° 22′ E. long., in a fine and fertile plain between two mountain ridges and the sea. The town is an oblong parallelogram, surrounded by walls furnished with bastions. It is rather more than four miles in circumference, the suburbs not included. It contains a fine central avenue, two squares, and some fine streets. The houses of Palermo are built nearly in the same style as those of Naples, with flat roofs and terraces, and balconies with Venetian blinds. The most remarkable buildings are the following:—1, The royal palace is an old building fortified like a castle, with a fine hall, a spacious court, and a splendid chapel. On the summit of the palace is the Observatory. 2, The cathedral, a magnificent gothic structure, built about the end of the 12th century. 3, The church 'del Gesù' is remarkable for its architecture and for the richness of its marble decorations, its paintings, and sculptures. 4, The university, founded in 1447, has a library of 40,000 volumes, a museum of antiquities, with some fine statues, and a fine collection of Græco-Sicilian medals. The academy of the fine arts, annexed to the university, has a gallery of valuable paintings. Besides the above, Palermo contains several beautiful churches, the great hospital, several hospitals and asylums, two monti di pietà, many fine palaces of the nobility, two theatres, military barracks, a castle, and a promenade along the sea-side, which leads to the public gardens. There are a few public schools, and many nunneries. The religion is exclusively Roman Catholic.

Palermo is an archbishop's see, and the residence of the king's lieutenant-general over all Sicily. It has a supreme court of justice for the whole island, a court of appeal for the province, and a commercial tribunal.

The neighbourhood of Palermo contains many delightful villas and mansions of the nobility. The village called Bagaria, on the sea-coast east of Palermo, is remarkable for several of these.

Two fine roads, the only carriage roads yet completed in Sicily, lead from Palermo, one to Monreale, and the other to Termini. The population of Palermo and its suburbs is about 150,000.

Palermo, under the name of Panormus (All-Port) was originally a Greek colony. It afterwards became subject to the Carthaginians; and next became a Roman colony. The Arabian emirs who ruled Sicily for several centuries made Panormus the capital of the island, and the Norman kings after them fixed their residence there. The Aragonese kings of Sicily resided at Palermo. When Sicily became united to the kingdom of Naples, Palermo lost its court, but retained the rank of capital of the kingdom of Sicily.

PALESTINE is the name commonly applied to the whole land anciently inhabited by the Israelites, including the country of the Philistines. The Romans generally called it Judæa.

The precise boundaries of this country are not very well defined; but it may be considered as lying between 30° 40′ and 33° 36′ N. lat., and between 33° 45′ and 35° 30′ E. long., having the Mediterranean on the west, the Jordan on the east, Lebanon on the north, and a desert country on the south. Its length from north to south is about 180 geographical miles; its breadth varies from 20 to 90 miles. The area may be estimated at about 11,000 square miles.

Palestine is a very mountainous country. A mountain-range commences in Syria south of the Orontes, and stretches to the south as far as the sources of the Jordan, where it divides into two branches, which continue their course nearly parallel to each other, and enclose between them the valley of the Jordan and its lakes. These two ranges diverge from each other at the head of the Gulf of Akaba; the one running along the eastern coast of that gulf and terminating on the shores of the Red Sea; the other along the western coast of that gulf, and terminating in the mountains of Sinai. The mountains of Lebanon, which are a part of this mountain-system, form the northern boundary of Palestine. They consist of two parallel ranges, the western range called Libanus, and the eastern range Anti-Libanus. The summit of the western range is quite barren; but the lower slopes, especially on the western side, are inhabited and cultivated. Among the trees which grow upon them are the remains of the celebrated cedars of Lebanon. Almost all the mountains of Palestine may be regarded as belonging to the two principal ranges which include the basin of the Jordan. The chief among them are Mounts Tabor, Hermon, Gilboa, Carmel, Ebal, and Gerizim, all of which are mentioned in Scripture. Judæa, or the southern part of Palestine, is full of hills, which are divided by valleys and torrents, and are for the most part of moderate height. They are composed of a friable rock, particles of which are washed down by the torrents, and form terraces on the slopes of the mountains. In ancient times these terraces were planted with the olive, the fig-tree, and the vine. At present the rocks are for the most part barren and desolate. The most mountainous part of Judæa is the district round Jerusalem.

Limestone is the prevailing constituent of all the mountains of Syria, as well as of Asia Minor and Greece. The general character of the stone of the mountains which compose the great central ridges of Syria, or which ramify from them, is that of a hard, calcareous rock, sonorous when struck, and of a whitish or pale yellow colour. It is in short a very hard kind of limestone, disposed in strata variously inclined, and, like all limestone strata, affording a great number of caverns, to which frequent allusion is made in the Scriptures. Some of them are capable of containing 1500 men, and there is one near Damascus which would even afford shelter to 4000. Black basalt, sandstone, micaceous stone, reddish brittle earth, beds of chalk, and a little coal, are met with in detatched spots. There are but faint traces of metallic veins. The Dead Sea and the shores of the Mediterranean yield abundance of salt. There are hot springs and asphaltum pits, and other indications of volcanic action.

From the general disposition of the high lands in Palestine, it follows that the chief valleys are longitudinal, and run from north to south. The transverse valleys have a general east and west direction, being formed by the offsets of the principal mountain ranges. The chief plain country is the low land along the Mediterranean on the west of the central range of mountains. The chief valleys are to the east of that range, and are the Bekka between Lebanon and Anti-Lebanon, the basin of the river Jordan and its lakes, and the great valley of Arabia extending from the Dead Sea to the Ælanitic Gulf. The great valley of the Jordan extends about 175 miles from the sources of the river in the north, to the southern extremity of the Dead Sea. It is bounded on both sides by mountains, which on the east rise almost precipitously from the bed of the river till near the head of the Dead Sea, where the valley becomes wider: on the west there is a fertile vale between the river and the mountains, averaging about a half or three-quarters of a mile in breadth, except at the lake of Gennesareth, where the mountains come close up to the shores. The valley of the Jordan is in fact a great longitudinal cleft, which traverses the country from north to south, and in its lowest part, the surface of the Dead Sea, is about 600 feet below the level of the Mediterranean.

On the borders of Galilee and Samaria lies the great plain of Esdraelon, called in Scripture the plain of Megiddo, and the valley of Jezreel. It is exceedingly fertile, and well adapted for growing corn. Samaria is less mountainous than either Galilee or Judæa; it is beautifully wooded, and full of fertile plains. Many of the lateral valleys of Galilee and Samaria, mentioned by name in Scripture, are very small. On the east side of the Jordan lie the rich pasture-lands of Argob and Bashan, extending from Mount Hermon to the river Jarmouk, a few miles south of the lake of Gennesareth. South of this was the land of Gilead, the limits of which are not precisely defined. The south of Palestine is skirted by the great sandy desert which extends to Egypt and Sinai. It bears various names, of which that of the Desert of Paran seems to be used in the widest extent.

There are no considerable rivers on the sea-coast of Palestine, the greater number of the

streams being only mountain torrents which flow down from the hills that run parallel to the coast. The chief of them are the Belus, Kishon, Chorseus, Kanah, Jarkon, Eshcol, Besor, and El-Arish. The most important river of Palestine is the Jordan (*Sheriat-el-Kebir*), which rises nearly in the latitude of Tyre, and flows southwards through the valley between the two great mountain-ranges already noticed, and, after traversing the lakes of Samochonitis and Gennesareth, falls into the Dead Sea. In the summer the Jordan is fordable in many places. Its course when it leaves the lake is very rapid, but it diminishes in speed as it proceeds. At its junction with the Dead Sea it is 200 or 300 feet broad. The whole course of this river is about 200 miles in a straight line, but not less than 150 miles if we take into account the windings of the stream.

The very remarkable lake which receives the waters of the Jordan occupies the site of the plain of Siddim, where stood Sodom and the other cities which God destroyed by fire in the time of Lot (Gen. xiv. 3; xix. 24, 25). It is called in Scripture the Salt Sea, the Sea of the Plain, and the East Sea; the Romans called it the lake Asphaltites; and it now bears the name of the Dead Sea; it is called by the Arabs Bahr Lut. It is of an irregular oblong figure, lying nearly due north and south. The dimensions assigned to it by Josephus are 72 miles long, by 18 broad. The waters and surrounding soil are so intensely impregnated with salt and sulphur, that no trees or plants grow on its banks, and no cattle can drink of its water. The consequence is that it is surrounded with that perfect desolation which has procured for it the name of the Dead Sea. The chief streams that fall into the Jordan and its lakes are the Jarmouk, Jabbok, Arnon, Daphne, Aenon, and Cedron.

Political Divisions.—The political divisions of the country were very different at different periods of its history. The first notice we possess of the country is when Abraham came from Mesopotamia to dwell in it. It was then inhabited by the Cananites, who were divided into eleven families or tribes, inhabiting different districts; while the Philistines dwelt on the sea-coast. After the conquest of the land by the Israelites, Canaan was divided by Joshua among the twelve tribes, each of which had its own district. These tribes were united into one kingdom under Saul and David. By the revolt of Jeroboam, Palestine was divided into the two kingdoms of Judah and Israel. The kingdom of Israel was overthrown, and the people carried away captive by the Assyrians. The country, being thus depopulated, was next inhabited by the neighbouring heathen people, and by colonies from other parts of the Assyrian Empire, who, mixing with the scattered remains of the tribes of Ephraim and Manasseh which were left about Samaria, formed the people spoken of in the New Testament as the Samaritans. In the year 588 B.C., Nebuchadnezzar overthrew the kingdom of Judah, and carried the greater number of its inhabitants into captivity. Upon the conquest of Babylon by Cyrus, Palestine fell under the dominion of the Persians. When Alexander the Great invaded Asia, Palestine submitted to him without a struggle. After his death the possession of it was the subject of fierce contests between the Greek kings of Egypt and of Syria. Having been driven to revolt by the oppressions of the Syrian kings, the Jews, under the leading of the Maccabees, recovered their independence, and restored the kingdom of Judah.

In the year 63 B.C. the country was conquered by Pompeius, and it remained thenceforward in subjection to the Romans, by whom the part of it west of the Jordan was divided into the three provinces of Judæa, Samaria, and Galilæa. Under Constantine, Palestine was divided into Prima, Secunda, and Tertia. Palestine has since shared the fortunes of SYRIA.

Towns and Villages.—In Upper Galilee were the towns and villages of Dan, Cæsarea Philippi, Bethsaida, Capernaum, Chorazin, and Magdala. Those in Lower Galilee were Tiberias, Cana, Sepphoris, Nazareth, Nain, Esdraelon, Shunem, and Bethsean.

The most ancient city of Samaria was the Shechem, or Sichem, of the Old Testament, the Sychar of the New Testament, which stood in the valley between Mounts Ebal and Gerizim. Near to Shechem was Jacob's Well. The Romans erected close to it the city of Neapolis, which still retains the name of Nablous. Other places were Samaria, Cæsarea Palestinæ, Dora, Endor, Apollonias, Antipatris, and Saron.

The chief city of Judæa was JERUSALEM, in the neighbourhood of which were the villages of Bethphage and Bethany, on the Mount of Olives, and Emmaus, farther to the north-west. Among the other towns and villages were Aijalon, Gibeon, Ephraim, Bethel, Jericho, Gilgal, Engeddi, Bethlehem, Hebron, Joppa, Lydda, Arimathea, Modin, Canatha, Hippos, Golan, Gamala, Gadara, Pella, Gerasa, Jabesh-Gilead, Ramoth-Gilead, Heshbon, Bethoran, and Machærus.

Some of the above towns and villages no longer exist; most of the others are now known by Turkish names.

PALESTRI'NA, the ancient Præneste, a town in the Campagna, 20 miles east of Rome, built on the south-west slope of a high hill, which is an offset of the Apennine ridge that skirts the valley of the Tiber on the east, and divides it from the high land of Abruzzo. The ancient Prænesto extended above the site of the present town, and its citadel crowned the summit of the hill. There are some remains of the old walls, built of large irregular blocks of stone. Palestrina is half way up the slope of the hill, and about 700 feet above the sea. It has 3500 inhabitants, and is a bishop's see. Many statues and other remains of antiquity have been found at Palestrina. In the middle ages this town was the chief stronghold of the family of Colonna, who often disputed with the popes the dominion of the Campagna, and of Rome itself.

PALESTRI'NA, GIOVANNI PIERLUIGI, DA, was born at Palestrina, near Rome, about the year 1524. His instructor in music appears to have been Claude Goudimel, a native of Besançon.

Palestrina was appointed Master of the Chapel to Pope Julius III. in 1551. In 1555 however Cardinal Caraffa succeeded to the papal throne, under the title of Paul IV., who, finding that Palestrina had quitted a state of celibacy, abruptly dismissed him, but in 1571 he was restored to his post in the Vatican. Up to the year 1560 he composed many works for the church, among which Baini especially mentions those 'Improperij,' 'so remarkable for depth of science and perfect adaptation of music to the sense of the words.'

During the above period however the Council of Trent, among other matters, took the state of ecclesiastical music into serious consideration, and appointed two cardinals whom they charged with its reform. By their direction Palestrina produced the composition known under the title of 'the Mass of Pope Marcellus.' The pope, before whom this mass was performed, was enraptured, and compared it to the heavenly melodies which the apostle John heard in his ecstatic trance.

On the restoration of Palestrina to his office, his fame spread widely, and to his other appointments was now added that of Maestro to the Congregation of the Oratory. He died, Feb. 2, 1594.

His works are exceedingly numerous, chiefly ecclesiastical. Three of his motets are in use in our cathedrals, adapted by Dean Aldrich to the English version of the 44th, 63rd, and 115th Psalms.

PALEY, WILLIAM, was born at Peterborough in 1743. He was descended from an old and respectable family. During his infancy his father removed to Giggleswick in Yorkshire, having been appointed head master of King Edward's School in that place. He was educated under his paternal roof, and speedily distinguished himself by great abilities, a studious disposition, and a ripeness and discrimination of intellect. In his 17th year he was entered a sizar of Christ's College, Cambridge. He graduated in January, 1763, and was senior wrangler. Having taken orders, he was elected fellow of his college in 1766, and soon after became one of the tutors. In 1775 Dr. Law, bishop of Carlisle, presented him to the rectory of Musgrove in Westmoreland. Shortly afterwards he married, left the university, and retired to his living. He passed through a succession of preferments, of trifling value, in the diocese of Carlisle; and in 1794 Dr. Porteus, bishop of London, made him a prebendary of St. Paul's, and Dr. Prettyman promoted him to the subdeanery of Lincoln cathedral. The year following, the bishop of Durham gave him the valuable rectory of Bishop-Wearmouth. The latter part of his existence was painfully subject to attacks of disease, which terminated in his death in 1805.

As a writer, he is distinguished not so much for originality as for that power of intellect by which he grasps a subject in all its bearings, and handles it in a manner entirely his own.

The greatest and most important of his works, 'The Principles of Moral and Political Philosophy,' was published in 1785. The general outlines of it had been delivered as lectures to his pupils when he was a tutor in the university. Though in some respects faulty, the work is a most valuable addition to English literature. In 1790 he published his 'Horæ Paulinæ,' certainly the most original of his works, and executed with singular ability. His 'View of the Evidences of Christianity' appeared in 1794. His last great work, 'Natural Theology,' was published in 1802. A very valuable and important edition of this work, with notes and scientific illustrations, was published not many years since by Lord Brougham and Sir C. Bell, the former furnishing a preliminary discourse of Natural Theology. Paley was also the author of various Sermons and Tracts A complete edition of Paley's works, in 4 vols., containing posthumous sermons, was published by his son the Rev. Edmund Paley, in 1838.

PALICOU'REA, a genus of plants belonging to the natural order *Cinchonaceæ*. *P. Marcgraavii* is a shrub from five to six feet high. It is a poisonous plant, used in Brazil to kill rats and mice. *P. crocea* is a native of Porto Rico, Trinidad, Cuba, and Guadaloupe. According to Von Martius this species is emetic. *P. officinalis* is a shrub clothed with harsh yellow down in every part. It is native of Brazil, and is reported to be a powerful diuretic.

Other species of this genus are said to have qualities similar to the last. *P. diuretica*, *P. strepens*, *P. sonans*, and *P. longifolia* are amongst those reported to possess medicinal virtues. *P. tinctoria* forms a fine red dye, much valued in Peru. There are 55 species enumerated, all of which are of easy culture and propagation. They grow best in a mixture of loam, peat, and sand, and will strike root readily under a handglass.

PALIMPSEST MANUSCRIPTS (παλίμψηστοι) are manuscripts from which the original writing has been erased or washed out, and which have been then written on again. This practice is as old as the time of Cicero, as appears from a letter of his to Trebatius ('Ad Fam.,' vii. 18), in which he praises his friend for having been so economical as to write on a palimpsest, but says that he should like to know what those writings could have been which were considered of less importance than a letter. The scarcity and expense of parchment, and the demand for the writings of the fathers and books of devotion in the middle ages, frequently induced the monks to erase or wash out the writings of the classical authors to make room for those of the fathers. In many cases however they did not obliterate entirely the ancient writing; and a careful examination of some of these palimpsest MSS. has led to the discovery of some valuable works and fragments of the classical authors. Among the most important of these discoveries is the treatise of Cicero, 'De Republica,' which was found in the Vatican Library at Rome by Angelo Mai, in a MS. which had been re-written with the commentary of St. Augustin on the Psalms. The Institutions of Gaius were also recovered in a similar manner in the library of the chapter of Verona.

PALINU'RUS (Zoology), the name given by Fabricius to a genus of crustaceans which forms the tribe of *Langoustiens* in the system of M.

Milne Edwards, being the fourth of his family of *Cuirassed Macrurians*, and characterised by the existence of antennæ of the ordinary form and the absence of didactylous pincers.

The genus *Palinurus* contains the Sea-Crawfish as they are popularly called, one species of which, the *Langouste* of the French, is common in our markets, but is accounted far inferior to the Lobster. This is the *Palinurus vulgaris* of the seas of Europe. The range of this group is very extensive. The Indian seas, the coasts of the Isle of France, of the Cape of Good Hope, of Chile, and of the Antilles, have their respective species.

PALISOT DE BEAUVOIS, AMBROISE MARIE FRANÇOIS JOSEPH, was born at Arras, July 27, 1752. His fondness for the study of natural history induced him to abandon the profession of the law, to which he had been brought up, and in 1786 to accompany an expedition despatched by the French to the west coast of Africa, for mercantile purposes. He spent about fifteen months in Benin and the neighbouring kingdom of Oware, investigating their natural productions. He then set out, in defiance of every danger and difficulty, for Abyssinia; but, after penetrating a considerable distance across the interior of Africa, the timidity or prudence of his companions compelled him to return. To re-establish his health, which was suffering from fever, he sailed for St. Domingo, where he suffered much persecution from the negroes, against all proposals for whose emancipation he had taken a conspicuous part; and who, having become the masters, threw him into prison. A mulatto woman effected his escape, and procured him the means of reaching the United States. On his arrival in Philadelphia, penniless and friendless, he learned that his name had been inserted in the list of proscriptions, and that it was no longer safe for him to return to France. By teaching music and languages, he supported himself for a short time, and, as soon as he procured the means, made a journey into the most remote parts of North America. He returned afterwards to France, and thenceforward occupied himself in the examination and publication of his collections of natural history. In 1806 he was called to the Institute as the successor of Adanson. In 1815 he was created titular Counsellor of the University of Paris by Napoleon. He died Jan. 21, 1820. The works on which his fame rests are his 'Flore d'Oware et de Benin,' Paris, 1804-21, 2 vols. folio; 'Insectes recueillis en Afrique et en Amerique,' folio, 1805-21; 'Essai d'une Nouvelle Agrostographie, ou Nouveaux Genres des Graminées,' 4to. and 8vo., 1812.

PALIU'RUS, a genus of plants belonging to the natural order *Rhamnaceæ*. *P. aculeatus*, Christ's Thorn, is a very common plant in Palestine, and on the borders of the Mediterranean Sea. The fruit has a very singular appearance, resembling a head with a broad-brimmed hat on. In the districts where it grows there is a tradition that this is the plant from which the crown of thorns was made which was placed on the head of our Saviour. This species of *Paliurus* is one of the most common thorns in the hedges of Asia, and its flexible spiny branches form an impassable kind of fence.

PALL, in Latin *pallium*, a cloak or covering; more especially used for the ornamental article of dress granted by the pope to patriarchs and archbishops, made of white wool, in the form of a band three fingers broad, to surround the shoulders, having pendants a span in length before and behind, the ends ornamented with red crosses. The origin of the pall is obscure, but its use is of high antiquity. Tertullian, who lived at the beginning of the third century, wrote a treatise 'De Pallio.' It is worn by all the eastern bishops, above the phenolion, or vestment, during the eucharist; and, as used by them, resembles the ancient pall much more nearly than that worn by Western metropolitans, approaching nearer to the shape of a cope.

PALLA'DIO, ANDREA, was born at Vicenza, in the Venetian territory. Of his family, his early youth, and his first studies, scarcely anything certain is now known. It appears that he went three times to Rome, and returned from the last of these journeys in 1547, when he was in his 29th year, and settled at Vicenza. The first work of any importance entirely designed by himself was the Basilica or Palazzo della Ragione at Vicenza, a large ancient gothic structure, the exterior of which he entirely remodelled. So great was the reputation he at once acquired by this edifice, that he was shortly after summoned to Rome by Paul III., who wished to consult him respecting the works then in progress at St. Peter's. He accordingly visited that city for the fourth time, but Paul died before he arrived. On his return he seems to have been overwhelmed with commissions, almost every one in Vicenza and its neighbourhood, who could afford to build, employing him to design them a mansion or villa, of which class of subjects the majority of his works consist. The reputation acquired by these and similar works led to Palladio's being invited to Venice. He was at first employed upon some alterations at the convent Della Carità, consisting of a Corinthian atrium, and a cloister beyond it. Two churches afterwards erected by him in the same city afforded him an opportunity of displaying his talents in buildings of that class. The first of them, San Giorgio Maggiore, was begun in 1556, though the façade was not erected till 1610. The still more celebrated church called Il Redentore was begun in 1578, about two years before the architect's death. One of his last works, if not his very latest, was the Teatro Olimpico at Vicenza, which he did not live to complete; for he died Aug. 6, 1580, and that structure was not entirely finished till 1583. Palladio wrote a work on the antiquities of Rome, 'L'Antichità di Roma,' Rome, 1554; but the work by which he is most generally known is his work on architecture, 'L'Architettura,' Venice, 1570, *fol.*; best edition, Vicenza, 1776-83, 4 vols. folio.

PALLA'DIUM, a metal discovered by the late Dr. Wollaston in the grains of native platinum, in the year 1803. Palladium is of a grayish white colour; it is very malleable, and slightly elastic. Its density is 11.3 when fused, but 11.86 when

rolled. It is almost as difficult of fusion as platinum. It is hard. It does not oxidize by exposure to the air.

Palladium combines with oxygen to form a *protoxide* and a *binoxide;* with chlorine it forms a *protochloride* and a *bichloride;* it also forms binary compounds with *carbon, sulphur,* and *phosphorus.*

This metal forms alloys, most of which are brittle, with arsenic, iron, bismuth, lead, tin, copper, silver, platinum, and gold; the alloy with nickel is ductile. Palladium, when fused with six parts of gold, destroys its colour; and this alloy was proposed by Dr. Wollaston for the graduated part of the mural circle of the Greenwich Observatory.

Palladium combines with the *nitric, sulphuric,* and other acids, to form salts. It has, of all metals, the greatest affinity for cyanogen, and the cyanide of mercury precipitates it from all its solutions, which gives an easy method of separating it from other metals. When the cyanide of palladium is heated, it is decomposed, and the palladium remains in its metallic state.

Most of the salts of palladium are soluble; those which contain the binoxide are little known; those of the protoxide are red or yellowish brown, and their solutions are of an intense yellowish red.

PALLA'DIUS, a Roman writer on agriculture, whose complete name is Palladius Rutilius Taurus Æmilianus. It is probable that he lived about the time of Valentinian and Theodosius. He is author of an extant work entitled 'De Re Rustica' in fourteen books. The style is inferior to that of Columella, and indicates a late period. The work of Palladius, probably owing in some degree to the convenience of the division, was much used in the middle ages, and the 'Speculum' of Vincent of Beauvais has borrowed much from it.

Palladius and the other Roman writers on Agriculture are contained in the edition of the 'Scriptores Rei Rusticæ' by J. M. Gesner, Leipzig, 1735, and in the improved edition of the same work by Ernesti, 1773. The latest edition and the best is by J. G. Schneider, Leipzig, 1794-7, 4 vols. 8vo.

PALLANZA. [Novara.]

PALLAS. [Planets, Small.]

PALLAS, PETER SIMON, was the son of a surgeon at Berlin, where he was born Sept. 22, 1741. He was brought up to the medical profession, and instructed in the natural and medical sciences, in which he made rapid progress. In 1758 he went to the university of Halle, and he afterwards visited those of Göttingen and Leyden. At Leyden he took his doctor's degree, on which occasion he wrote an inaugural dissertation on intestinal worms. Zoology had now become his ruling passion, and in 1761, he came to London for the avowed object of studying medicine, but in reality for the purpose of examining the different collections of animals in this country. In 1763 he obtained his father's permission to settle at the Hague, where, in 1766, he published his 'Elenchus Zoophytorum,' a work which acquired him considerable reputation. The 'Miscellanea Zoologica,' which appeared the same year, further increased the fame of Pallas, and he had appointments offered him by several foreign governments. Among others he attracted the notice of the Empress Catherine, who invited him to St. Petersburg, and offered him the professorship of natural history in the Imperial Academy of Sciences, which he accepted in 1767.

At the time of his arrival in Russia, an expedition, composed of a number of astronomers and other scientific men, was on the eve of setting out, by command of the Empress, for the purpose of observing the transit of Venus, and of investigating the natural history and geography of Siberia and the other northern parts of the Russian Empire. Pallas gladly accepted an invitation to accompany the expedition, which set off in June, 1768. The first summer was spent in traversing the plains of European Russia, and the winter was passed at Simbirsk, on the Volga. The next year the expedition visited the borders of Calmuck Tartary, when Pallas carefully examined the shores of the Caspian Sea. They afterwards proceeded through Orenburg, and passed the next winter at Ufa. In 1770 Pallas crossed the Uralian Mountains to Ekaterinburg, and thence proceeded to Tobolsk, the capital of Siberia. The year following the expedition reached the Altai Mountains, across which Pallas penetrated to the frontiers of China, whence he retraced his steps, and slowly proceeded homewards, visiting Astracan and the neighbourhood of Mount Caucasus on the way back. He reached St. Petersburg in July, 1774, having been absent six years.

The Empress Catherine decorated him with titles, and gave him several lucrative appointments. After remaining many years at St. Petersburg, quietly engaged in the pursuits of literature and science, in 1793 and 1794 he travelled through the southern provinces of Russia, and then settled in the Crimea, where he stayed for fifteen years; after which he sold his property and quitted Russia. Pallas arrived at Berlin in 1810. He died Sept. 7, 1811.

The following are his principal works:—'Elenchus Zoophytorum,' Hague, 1766, 8vo.; 'Miscellanea Zoologica,' Berlin, 1767, 4to.; 'Travels through different Provinces of the Russian Empire,' published in German, St. Petersb., 1771-76, 3 vols. 4to.; 'Flora Rossica,' 2 volumes of which were published at St. Petersburg, in fol., 1784-85: no more appeared. The last great work which he wrote was a Fauna of the Russian Empire, which he intended to embrace all the animals found both in European and Asiatic Russia. He worked at it till his death, and completed the manuscript of the vertebrate animals, which was printed in 3 vols. 4to., at St. Petersburg, in 1811, under the name of 'Zoographia Rosso-Asiatica;' but it was not published till 1831. Pallas may be said to have laid the foundation of modern geology in a memoir containing 'Observations on the Formation of Mountains,' which was read to the Academy of St. Petersburg, in 1777, before Gustavus III. of Sweden. He also wrote a 'History of the Mongolian Nations,' 2 vols. 4to., in German, Petersb., 1776-1801; and undertook, by command of the Empress, a 'Comparative

Vocabulary' of all the languages of the world, two volumes of which were published at St. Petersburg in 1787–1789, in 4to. Among many other works, Pallas published 'Travels through the Southern Provinces of the Russian Empire, in the years 1793 and 1794,' Leipzig, 1801, 2 vols. 4to., in German, of which there is an English translation.

Pallas was a member of the Royal Society of London, of the Institute of France, and of several other foreign academies, besides that of St. Petersburg; and he wrote many Memoirs, which were published in their different Transactions

PALLAVICINO, SFORZA, son of the Marquis Alessandro Pallavicino of Parma, was born at Rome in 1607. He studied in the Roman College, and afterwards entered the order of the Jesuits. He wrote a philosophical treatise, 'Del Bene' (on happiness), and another treatise, 'Dello Stilo' (on style in written composition). But the work for which he is best known is the 'History of the Council of Trent' ('Istoria del Concilio di Trento,' 3 vols. 4to., Rome, 1664), written in defence of the see of Rome against the charges and insinuations brought against it by the celebrated Father Sarpi in his History of the same Council. Pope Alexander VII. made Pallavicino a cardinal, and employed him in important affairs. He died in 1667.

PALLIAL IMPRESSION. This term is used by conchologists to denote the mark formed in a bivalve shell by the *Pallium* or mantle. It is, normally, found near the margin of the shell, and is, thence, sometimes called the Marginal Impression. In the *Dimyaria*, or Bivalves which have two impressions of muscles of attachment, this mark passes from one of those impressions to the other; and if in its passage it bends inwards posteriorly, it is said to be *sinuated*, and the part where this occurs is the *siphonal scar* of Mr. Gray.

PALM-OIL. [Elæis; Oils.]

PALM-SUNDAY, the Sunday before Easter, so named because on that day boughs of palm-trees used to be carried in procession, in imitation of those which the Jews strewed in our Saviour's way when he went up to Jerusalem. The ceremony of bearing palms on Palm-Sunday was retained in England after many other ceremonies were dropped.

PALM-TREE. [Palms.]

PALMA. [Canaries.]

PALMA, GIACOMO, called *Il Vecchio* (the Old), to distinguish him from his great-nephew of the same name, was born at Serinalta, in the territory of Bergamo, about 1510, and died about 1560, but the dates both of his birth and death are not precisely fixed. Vasari says he died at the age of 48. Palma's manner has much resemblance to that of Titian; and his paintings are highly esteemed for the noble taste of his composition, for natural and pleasing expression, and the harmony of his colours. The galleries of Vienna, Munich, and Berlin possess several of his works, and there are some in England.

PALMA, GIACOMO, called *Il Giovane* (the Young), was born at Venice in 1544. He soon left the style of Antonio his father, an indifferent master, to study the works of Titian and Tintoretto. Many of his productions are marked by carelessness and haste; yet when time and price were not too much limited, he produced works rich in composition, full of beauty, variety, and expression. His tints, fresh, sweet, and transparent, less gay than those of Veronese, but livelier than those of Tintoretto, though slightly laid on, still preserve their bloom. Palma died in 1628.

PALMA CHRISTI. [Ricinus.]

PALMA NOVA. [Udine.]

PALMACEÆ. [Palms.]

PALMAROLI, PIETRO, a painter and celebrated picture restorer, who was the first to transfer frescoes from the wall to canvas. The first work so transferred was the Descent from the Cross by Daniele da Volterra, in the church of Trinità de' Monti, in 1811. Palmaroli did great service as a restorer. Among other useful works he freed in 1816 the celebrated fresco of the Sybils, painted by Raphael for 'Agostino Chigi in the church of Santa Maria della Pace, from the destructive *restorations* in oil which were made by order of Alexander VII. He died at Rome in 1828.

PALMI. [Calabria.]

PALMIC ACID is obtained from *Palmin*, a white solid substance, which is itself obtained from castor-oil. Palmic acid fuses at 122°; the crystals are acicular and colourless; it dissolves in all proportions in alcohol and æther: it reddens litmus paper strongly, and combines with bases to form salts, which are called *palmates*.

PALMIN. [Palmic Acid.]

PALMI'PEDES, Cuvier's name for his 6th order of birds, answering to the order *Natatores* (swimming order) of most English ornithologists.

Cuvier divides his *Palmipedes* into four families. The Divers (*Brachypteræ*); the *Longipennes* or *Grands Voiliers* (Albatrosses, &c.); the *Totipalmes* (Pelicans, &c.); and the *Lamellirostres* (Swans, Geese, Ducks, &c.).

PALMS are woody plants, usually trees, with simple stems, inhabiting the warmer parts of the world and especially tropical countries. They constitute a natural order of Endogens most important on account of the many uses to which the species or their products are applied, but in reality nearly allied to the *Liliaceous* and *Juncaceous*, or Rushy, plants of northern countries.

There is scarcely a species of this order in which some useful property is not found. The cocoa-nut, the date, and others are valued for their fruit; the fan-palm and many more, for their foliage, whose hardness and durability render it an excellent material for thatching; the sweet juice of the palmyra when fermented yields wine; the centre of the sago-palm abounds in nutritive starch; the trunk of the *Iriartea* or *Ceroxylon* exudes a valuable vegetable wax; oil is expressed in abundance from the oil-palm; an astringent matter resembling dragon's blood is produced by *Calamus Draco*; many of the species contain within their leaves a kind of fibrous matter, so hard and tough that it is manufactured into cordage; and finally, their trunks are in some cases valued for

their strength and used as timber, or for their elasticity, or their flexibility, as in the cane-palm.

PA'LMYRA, TADMOR. Both these names are derived from the palm trees which once grew in the neighbourhood of this ancient city. Palmyra is situated in an oasis of the Syrian Desert, nearly half-way between the Orontes and the Euphrates, and about 140 miles E.N.E. from Damascus, in 34° 24′ N. lat., and 38° 20′ E. long., according to Major Rennell.

Palmyra is sheltered by hills to the west and north-west, and supplied with wholesome water. It is on a line leading from the coast of Syria to the regions of Mesopotamia, Persia, and India, a circumstance which must have pointed it out to the caravans as a convenient halting-place in the desert. We read in the Second Book of Chronicles (viii. 4), that Solomon 'built Tadmor in the wilderness, and all the store cities which he built in Hamath.' In the time of Pliny it was the intermediate emporium of the trade with the East, a city of merchants and factors, who traded with the Parthians on one hand and the Romans on the other. The produce of India found its way to the Roman world through Palmyra. It afterwards became allied to the Empire as a free state, and was greatly favoured by Hadrian and the Antonines, under whom it attained its greatest splendour.

Odenatus, a native of Palmyra, having rendered great services to the Roman Empire in a war against the Persians, assumed, with the consent of Gallienus, the title of king of Palmyra, and Gallienus conferred upon him the command of all the forces of the East. His wife Zenobia succeeded him, and took the title of Queen of the East. The Emperor Aurelian led an army against this warlike woman, took Palmyra, and carried Zenobia captive to Rome. She spent the rest of her life at Tibur. The place suffered greatly from the siege of Aurelian, but Diocletian built or restored several edifices. The latest historical notice of Palmyra is its plunder, A.D. 1400, by the army of Tamerlane. It is now a ruined place, inhabited by a few Arabs. The numerous ruins and columns make a striking appearance as they are seen from the desert, but few of the remains possess great architectural merit, and on the whole they are inferior in grandeur and style to the remains of Bâlbeck in Syria. Wood and Dawkins visited Palmyra about the middle of the last century, and published a description of its remains, with plates, folio, London, 1758. Palmyra has since been visited by Volney, Cassas, Bankes, Irby and Mangles, and other travellers. The inscriptions found at Palmyra are Greek and Palmyrene, with one in Hebrew, and one or two in Latin.

PALMYRA. [BORASSUS.]

PALOMI'NO Y VELASCO, DON ACISLO ANTONIO, an eminent Spanish painter, was born in 1653, some say 1658, at Bujalance, near Cordova. He was introduced to King Charles II. at Madrid by the celebrated Coello, and obtained a commission to paint the gallery Del Ciervo. He painted the history of Psyche so entirely to the king's satisfaction that he gave him the title of his principal painter and a considerable pension. He died at Madrid, April 13, 1726. He left a large number of paintings, one of the best of which is the Confession of St. Peter in the Cathedral of Valencia. Palomino is the author of a work in three parts, theoretical, practical, and biographical. The first two bear the title of 'El Museo Pictorico y Escala Optica.' The third part, 'El Parnaso Español Pictorico,' Madrid, 1724, though perhaps only intended as an appendix to the two others, is by far the most important and interesting.

PALOS, a small town and port of Andalucia, situated near the mouth of the Tinto, on the south-western coast of Spain, is the spot from which Columbus sailed on his first voyage of discovery on the morning of Aug. 3, 1492. The town contains about 1100 inhabitants, who trade with Seville in wine, brandy, and wood.

PALSY. [PARALYSIS.]

PAMIERS. [ARIE'GE.]

PAMPELUNA (*Pamplona*). [NAVARRA.]

PA'MPHILUS was a native of Amphipolis (Suidas, 'Apelles'), but he studied his art under Eupompus of Sicyon, and succeeded in establishing the school which his master founded. Pamphilus succeeded Eupompus in the school, and taught his principles to Apelles. Such was the authority of Pamphilus, says Pliny (xxxv. 10, 36), that chiefly through his influence, first in Sicyon and then throughout all Greece, noble youths were taught the art of drawing before all others; it was considered amongst the first of liberal arts, and was practised exclusively by the free-born, for there was a law prohibiting all slaves from the use of the cestrum or graphis. In this school of Pamphilus, the most famous of all the schools of ancient painting, the progressive courses of study occupied the long period of ten years, comprehending instruction in drawing, geometry, anatomy, and painting in its different branches. One of his paintings, the 'Heraclidæ,' is mentioned by Aristophanes ('Plutus,' 385), and Pliny mentions the Battle of Phlius, and Ulysses on the Raft.

PAMPHILUS. [EUSEBIUS PAMPHILUS.]

PAMPHY'LIA, a province of Asia Minor, extended along the coast of the Mediterranean from Olbia to Ptolemais (a distance of 640 stadia according to Strabo). It was bounded on the north by Pisidia, on the west by Lycia and the south-western part of Phrygia, and on the east by Cilicia. Pamphylia was separated from Pisidia by Mount Taurus, and was drained by numerous streams which flowed from the high land of Pisidia. The eastern part of the coast is described by Captain Beaufort as flat, sandy, and dreary, but this remark does not apply to the interior of the country, which, according to Mr. Fellows's account ('Excursion in Asia Minor,' p. 204), is very beautiful and picturesque. The western part of the coast is surrounded by lofty mountains, which rise from the sea, and attain the greatest height in Mount Sólmya on the eastern borders of Lycia. Pamphylia contained Olbia on the coast, and Attalia (*Adalia*) founded by Attalus Philadelphus, king of Pergamus. East of Attalia was Perge, which was visited by St. Paul, as well as Attalia. Perge contains the remains of a large theatre and other ruins. Aspendus, on the Eurymedon, was a

town of some note in Cicero's time, and full of works of art. East of Aspendus was Side, which contains the remains of a large theatre.

PAMPLONA. [NAVARRA.]

PAN, a deity of the Greek mythology, whose country was Arcadia. He was the tutelary god of the shepherds. Pan is represented with two horns, a goat's beard, a goat's tail, and goat's feet, holding the syrinx, a kind of musical pipe, which he was said to have invented. The satyrs are his attendants. He was said to have accompanied Bacchus to India, and that upon one occasion, by uttering a loud scream, which was repeated by the echoes, he scared away the enemy. From these incidents the expression 'panic fear,' meaning a terror produced by no obvious or sufficient cause, appears to have been derived. The worship was introduced into Italy, where he was also called Inuus; and festivals, called Lupercalia, were instituted in honour of Pan Lupercus, the protector of the flocks against wolves.

PANÆNUS of Athens, the brother or the nephew of Phidias, the former according to Pliny and Pausanias, the latter according to Strabo, was one of the first of the Greeks who attained to any great excellence in painting. Panænus assisted Phidias in decorating the Olympian Jupiter, but his most famous work was the 'Battle of Marathon' in the Pœcile at Athens.

PANÆTIUS, a Greek philosopher, was a native of Rhodes. He studied at Athens, under Diógenes the Stoic, and afterwards came to Rome, about 140 B.C., where he gave lessons of philosophy, and was intimate with Scipio Æmilianus, the younger Lælius, and Polybius. After a time Panætius returned to Athens, where he became the leader of the Stoic School, and where he died at a very advanced age. Panætius was not apparently a strict Stoic, but was rather an Eclectic philosopher, who tempered the austerity of his sect by adopting something of the more refined style and milder principles of Plato and the other earlier Academicians. (Cicero, 'De Finibus,' iv. 28.) Cicero speaks repeatedly of the works of Panætius in terms of the highest respect. None of his works have been preserved. He wrote a work 'On Duties,' which Cicero used in his treatise 'De Officiis.' He also wrote 'on Divination,' and Cicero may have availed himself of this work also in his treatise which bears the same title. Other works of Panætius are mentioned by Cicero and Diogenes Laertius.

PANAMA, THE ISTHMUS OF, constitutes the most eastern and the narrowest portion of the long isthmus by which the two Americas are united. It extends, together with the province of Veragua, which is contiguous to it on the west, from 77° to 83° W. long., between 7° 20′ and 10° N. lat. When measured along its curve, the length from east to west is nearly 500 miles. Its width varies from 30 to 100 miles.

It used to be supposed that the Andes extended through the Isthmus; but this is now known not to be the case. West of 77° 30′ W. long. no range of hills or mountains, not even an isolated elevation of moderate height occurs, and the whole isthmus between the two seas is a flat country, only a few feet above high-water mark. This low country extends westward for more than a hundred miles to the western extremity of Mandingo Bay. The average width of this part of the Isthmus does not exceed 40 miles, and opposite Mandingo Bay, called also the Gulf of San Blas, it contracts to less than 30 miles. The shores on both oceans are rocky, and the whole region appears to consist of an immense mass of rock. Two rivers drain the Isthmus. They are called Chucunaque and Chepo, and rise near 78° 30′ W. long. Both rivers are navigable for large river barges as far as the places where the great bends occur. With all the advantages which this region possesses from its great fertility and the vicinity of two great oceans and navigable rivers, it is thinly inhabited, and chiefly by a tribe of Indians, the Mandingoes, or San Blas Indians. At the western extremity of Mandingo Bay some hills commence; between these mountains flows the river Chagres. [CHAGRES.] West of a line drawn from the vicinity of Panamà, on the Pacific, to the Bay of Limones, begins the third region of the Isthmus, which extends westward on the Caribbean Sea to the rocky island called Escudo de Veragua, and on the Pacific to the innermost corner of the Gulf of Parita, a distance of about 80 miles. This country is, properly speaking, a plain which rises from both oceans with a very gentle ascent towards the middle of the Isthmus. The principal rivers of this region are the Trinidad and the Caymito or Chorrera. West of this region is the table-land (mesa) of Veragua. The general elevation of this table-land above the sea-level is supposed to be between 3000 and 4000 feet; and it has peaks from 7000 to 9000 feet high. The most western portion of the Isthmus begins at the western declivity of the table-land of Veragua, and extends to the boundary-line of Central America. The northern part is occupied by the Chiriqui Lagoon, a sheet of water 90 or 100 miles in length from east to west, and on an average 20 miles wide. It is separated from the Caribbean Sea by a series of low, swampy, and wooded islands, between which there are three deep passages for vessels. There is a hilly region behind, from which numerous rivers flow into the lagoon.

This isthmus is very rich in vegetable productions. Forest trees, dye-woods, fruits, esculent vegetables, rice, maize, &c., grow very abundantly. Cattle, horses, and mules are reared in those districts where there are natural prairies or savannahs. The woods are inhabited by numerous wild animals. The sea abounds with fish, especially sharks, which are eaten, alligators, and turtle. Gold, copper, iron, tin, and mercury, are the chief mineral productions.

The Isthmus constitutes one of the departments of the republic of New Granada, that *of Istmo*, and is divided into two provinces, the province of Panamà, which comprehends all the countries east of the table-land of Veragua, and the province of Veragua, which extends over the table-land of that name and the country south of the Chiriqui Lagoon, to the boundary-line of Central America. The province of Panamà is subdivided into six cantons, and that of Veragua into four.

The Isthmus contains several good harbours; of which those of Puerto Bello, Puerto de Naos, and Chagres are the best known on the Atlantic side; and Panamà on the Pacific side.

Panamà is the principal town. It stands upon a tongue of land, and the streets extend across from sea to sea. The houses are of stone, generally two or three stories high, substantially built, and the larger houses have courts. The public edifices are, a beautiful cathedral, four convents, a nunnery of Santa Clara, and a college. The town contains about 12,000 inhabitants.

In the interior of the Isthmus, west of Panamà, there are several considerable towns. The town of Chorrera, on the banks of the Caymito or Chorrera, has 4000 inhabitants. Natà has a population of 4262, and Los Santos of 4318. These two places are near the shores of the Bay of Panamà, but have no harbours. In the province of Veragua, the capital, Santiago de Veragua, has about 5000 inhabitants; the town of La Mesa, 4500; and Santiago de Alange, 3000.

A great portion of the Isthmus, perhaps one-third, is still in the exclusive possession of the aborigines. These tribes occupy both extremities of the Isthmus. The chief tribes are the Mandingoes and the Valientes. The population of those parts of the Isthmus in which European settlements have been made consists chiefly of mulattoes and negroes, the number of whites being comparatively small, except in Panamà and in the larger towns.

The countries inhabited by the Mandingo and Valientes Indians are annually visited by several vessels from Jamaica, which export considerable quantities of tortoiseshell, sarsaparilla, and fustic, and also some cacao; they import manufactured cotton goods, cutlass-blades, and a variety of toys and small articles. The port of Chagres is visited by European vessels; and that of Panamà by vessels from various towns on the west coast of South America. The transit trade across the Isthmus is managed either by mules or on men's backs. There have been many engineering projects, some of which are now before the public, for making either a ship canal or a railway across the Isthmus, so as to connect the Atlantic with the Pacific.

For further details see GRANADA, NEW.

PANATHENÆ'A (Παναθήναια), the greatest of the Athenian festivals, was celebrated in honour of Athena (Minerva) as the guardian deity of the city of Athens. It is said to have been instituted by Erichthonius, son of Hephæstus, and to have been called originally Athenæa; but it obtained the name of Panathenæa in the time of Theseus, in consequence of his uniting into one state the different independent states into which Attica had been previously divided. (Paus., viii., 2, s. 1; Plut., 'Thes.,' c. 20; Thucyd., ii. 15.)

There were two Athenian festivals, which had the name of Panathenæa; one of which was called the Great Panathenæa, which was celebrated once in every five years, and attracted spectators from all parts of Greece; and the other, the Less Panathenæa, which was celebrated every year in the Piræus. The Great Panathenæa was celebrated on the 28th day of Hecatombæon the first of the Athenian months. The most important part of the Great Panathenæa was the procession, in which was carried the Peplus, or sacred vest, of Athena. This procession formed the subject of the bas-reliefs which embellished the outside of the Parthenon. A considerable portion of this frieze is in the British Museum, and is described in the 'Elgin Marbles' published by the Society for the Diffusion of Useful Knowledge, vol. i. p. 161-231.

PANAX, a genus of plants belonging to the natural order *Araliaceæ*. *P. quinquefolium* is the Five-Leaved Panax, or Ginseng. [GINSENG.]

PANCHA-TANTRA. [BIDPAI.]

PANCRA'TIUM, a genus of plants of the natural family of *Amaryllideæ*. They are mostly highly ornamental plants with white flowers, many of them fragrant.

PA'NCREAS is a secreting gland situated behind the stomach, and extending from the spleen transversely across the vertebral column to the duodenum. In man it is of an elongated and slightly-flattened form, broadest at its right extremity, and gradually diminishing in breadth towards the left. It is of a firm consistence, lobulated, and very similar in structure to the salivary glands, from which circumstance it is often called the salivary gland of the abdomen. Its function appears to be to assist in the assimilation of the food.

PANDA (*Ailurus fulgens*, F. Cuvier), a plantigrade five-toed quadruped, of carnivorous habits, the situation of which in the arrangement of the mammalia is somewhat obscure.

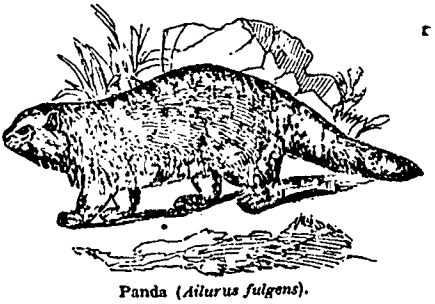
$$\text{Incisors, } \frac{6}{6}\text{; Canines, } \frac{1-1}{1-1}\text{; molars, } \frac{5-5}{5-5} = 36.$$

In dentition this genus approaches that of the Racoons, but the molars have their crowns studded with sharp tubercles, which become worn down by long usage. The molars of the upper jaw are broad and large, those of the lower jaw narrow. The Panda is an inhabitant of the Himalayas between Nepaul and the Snowy Mountains, and was first discovered by General Hardwicke, whose paper on this animal was read on the 6th of Nov. 1821, to the Linn. Soc. of London. The publication of this paper was delayed till the author's return to England, when he brought with him a second skull of the same species from India. Whilst the paper was going through the press, he found that a description and figure had been recently published by M. F. Cuvier in his 'Histoire des Mammifères,' under the name of *Ailurus fulgens*, and the general's name was therefore, with his consent, suppressed.

The French attribute the discovery of the animal to M. Duvaucel.

The Panda is a short-muzzled round-headed animal, covered with full soft fur, and having a tail of moderate length, resembling a lady's boa. In size the animal equals a badger, and is of a robust figure; its limbs are stout; its feet five-toed; but the soles instead of being naked are covered with thick close wool, of a pure white, or grayish white, forming a strong contrast to the deep black

of the legs and under surface. The claws are short, sharp and semi-retractile. The ears are short, pointed and lined and tufted with white fur. The colour of the upper surface is a beautiful fulvous red, the head being much paler; the muzzle is white, with a red dash beneath the eyes; the tail is banded red and yellow, but not very strongly; limbs and under parts abruptly black. The fur consists of a soft, deep, woolly undercoat, with long hairs overlying it.



Panda (*Ailurus fulgens*).

General Hardwicke states that this animal's haunts are about rivers and mountain-torrents. It lives much in trees, and feeds on birds and the smaller quadrupeds, and is frequently discovered by its loud cry or call resembling the word Wha, often repeating the same.

PANDANA'CEÆ are arborescent or bushy plants, classed with Endogens, among which they are, more especially in the genus *Pandanus*, remarkable for their stems forking repeatedly.

PA'NDANUS, a genus of plants which belong to the natural family of *Pandanaceæ*, or Screw-Pine tribe. The leaves resemble those of the pine-apple, and are inserted spirally along the stem. The species are found in the islands of the tropical ocean, in those of Mauritius and Bourbon, as well as in the southern parts of India. One species, *P. odoratissimus*, being highly fragrant, is much esteemed in all Asiatic countries. Oil impregnated with the odour of its flowers and the distilled water are highly esteemed both for their odour and their medicinal use as stimulants.

PANDECT. [JUSTINIAN'S LEGISLATION.]

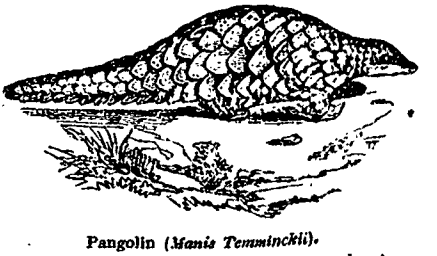
PANEGYRIC (from the Greek 'panegyricus,' *πανηγυρικὸς λόγος*) is a species of oration in praise of a person or thing, so called because such discourses used to be delivered in ancient Greece on the occasion of great public festivals before the whole assembly, 'panégyris,' of the people. The orator began by praising the deity who presided over the festival, such as Jupiter in the Olympic Games and Apollo in the Pythian; he then spoke in praise of the community or town in which the games were held, and lastly of the magistrates, the champions, and especially the victors who gained the prizes. Afterwards the name came to be applied to political orations delivered in the senate or council of a state in praise of that state or of the leading men or man in it. The panegyrical oration of Isocrates is a fine specimen of the kind, in which he commemorates the glories of Athens, the services which it had rendered to Greece in general, and the whole with a view to nourish friendly feelings between it and the other Greek states. The Panathenaic oration of Isocrates is another composition of the same class.

Under the Roman Empire panegyrics were composed in praise of the emperors. Pliny's panegyric of Trajan is a specimen of this kind.

PANEL. [JURY.]

PANGOLINS, mammalia belonging to the insectivorous section of the order *Edentata*, and representing in Africa and India the Ant-Eaters and Armadillos of South America. These animals form the genus *Manis* of Linnæus.

The Pangolins, or Scaly Ant-Eaters, may be known at once by the armour of dense horny scales or triangular plates overlapping each other, by which every part of the body, except the middle line of the under surface, is completely invested. The body is depressed, rounded above, long, and low; the head is small and conical; the eyes are minute; there are no external ears; the mouth is small, and the tongue long and extensible; teeth none; the tail is long, broad, and covered above and below with hard imbricated scales; the limbs are very short and thick, and mailed like the rest of the body. No distinct toes are apparent beyond the claws, which on the fore-feet are five in number; the three central ones being of enormous size, arched, thick, and bluntly pointed. The first and the last claw are very small. The large claws fold down on a thick coarse pad as in the Ant-Eater, and the mode of progression in both cases is the same. The hind feet have five short, thick, blunt claws, edging a pad-like sole, covered with coarse granular skin, and so protuberant that the claws do not fairly touch the ground. The ungueal phalanges, or last joints of the toes, both of the fore and hind feet, which are sheathed by the claws, are remarkable for being bifurcated at their extremity, a peculiarity found in no other animals of the Edentate order. The osseous frame-work generally is moulded upon the same plan as that of the Ant-Eaters. Slow in their motions and unfurnished with efficient weapons of offence, the Pangolins defy the assaults of almost every foe. When attacked they roll themselves up into a ball, wrap the tail over the head, raise up all the pointed and sharp-edged scales in serried array, and thus invulnerable, conquer by passive resistance. The food of these animals consists of termites and ants, which it takes by means of its long



Pangolin (*Manis Temminckii*).

glutinous tongue, in the same manner as the Ant-Eater. They dwell in holes and burrows. The

species are rather numerous. Some are exclusively confined to the continent of India; others belong to Java and the adjacent islands; and several are African.

By way of example, we have given the *Manis Temminckii* of Smith, a native of South Africa.

(For an account of the habits of this animal we refer to Dr. Smith's *Illustrations of the Zoology of South Africa.*)

PANICLE is a kind of inflorescence, or arrangement of flowers, in which the axis is divided into a number of lateral branches, each of which is again subdivided into other branchlets. Examples of it may be found in the Lilac, the *Agrostis stolonifera*, and the Horse-Chestnut.

PA'NICUM, a genus of grasses the name of which was applied to one of the species (Millet) by the Romans, and which, Pliny states, is so called from its flowers being in a panicle. The genus contains a very large number of species, which abound in the hot parts of the world, though a few extend to higher latitudes and ascend the cool mountains of hot countries. They are chiefly valuable as pasture grasses, and for their seeds, which form a large portion of the food of the poorer classes of many nations. *P. miliaceum*, or Millet, is the best-known species. [MILLET.]

PÂNINI, the most celebrated of the Sanscrit grammarians, is said to have been the grandson of the inspired legislator Dâvla, and lived at so remote an age that he is reckoned among the fabulous sages mentioned in the *Purânas*. (Colebrooke, 'Asiat. Res.,' vii., p. 202.)

Pânini's grammar consists of 3996 short aphorisms, or *sutras*, divided into eight books, in which the rules of grammar are delivered with such oracular brevity and obscurity that they need a commentary to render them intelligible even to the learned Indians.

PANI'NI, PAOLO, an eminent painter of architecture, was born at Piacenza, in 1691. He formed his style of composition after the works of Ghidolfi, in which he was so successful that he soon excelled all his contemporaries in that department of the art. His paintings are universally esteemed for the grandeur of the architecture, the correctness of the perspective, and the clearness of the colouring. His figures also are designed with taste, and cleverly grouped. There are several pictures by Panini at Rivoli, a country-house belonging to the King of Sardinia, representing views of that seat and the environs.

PANIO'NIUM. [IONIA.]

PANJAB. [HINDUSTAN.]

PANNAH. [HINDUSTAN.]

PANNO'NIA, the name of a province of the Roman Empire, was bounded on the north and east by the Danube, on the south by Illyricum and Mœsia, and on the west by Noricum. It was separated from Mœsia by the Savus (Save), and from Illyricum by an imaginary line drawn a few miles south of the Save; but the boundaries between Noricum and Pannonia differed at various times. Under the early times of the Roman Empire Pannonia could not have extended much farther west than the Narabo or Arrabo (Raab), if Pliny (iii. 27) is correct in placing Sabaria in Noricum; but in later times the two provinces appear to have been separated by Mount Cetius (Kahlenberg). Pannonia would thus correspond to Sclavonia, parts of Hungary, Lower Austria, Styria, Croatia, and to those parts of Turkish Croatia, Bosnia, and Servia, which immediately touch upon the Save.

The principal towns of Pannonia were Vindebona, now Vienna; Carnuntum, the head quarters of M. Aurelius during his war with the Marcomanni; Brigantium or Bregettio (Ammianus Marcellinus, xxx. 6) on the Danube; Aquincum, Buda, or Ofen; Taurunum, Semlin, near the confluence of the Save and the Danube. In the southern part of the province were Siscia, Cibalis, and Sirmium, all on the Save. Sirmium under the later Empire was the chief town in the province.

PANORA'MA (from the Greek πᾶν, all, and ὅραμα, a view), a picture showing a view completely around the spectator. This ingenious pictorial contrivance was first devised by an English artist, Robert Barker, about the year 1794; and is not so much a new mode of painting—the process itself being similar to scene-painting or in distemper—as a novel application of it. Contrary to the diorama [DIORAMA], the panorama forms the surface of a hollow cylinder or rotunda, in the centre of which is a detached circular platform for the spectators, covered overhead to conceal the skylight, and thereby increase the illusion and give greater effect to the painting itself. The view is not painted on the walls, but upon canvass, like the scenes of a theatre, and afterwards fixed up, in order that the picture may be changed. The subjects generally chosen are views of cities, or interesting sites, whose entire locality and buildings may thus be vividly placed before the eye, in a manner no less instructive than interesting.

PANORMUS. [PALERMO.]

PANSY, a corruption of the French word *pensée*, is a name now chiefly applied to the garden varieties of *Viola tricolor*, *Altaica*, and others, which are commonly cultivated under the name of Heart's-Ease. When skilfully managed, they are great ornaments of the flower-beds in a garden, but they are short-lived, and require to be continually renewed by seeds or cuttings.

PANTHE'ON, a celebrated monument at Rome, of which Valerius of Ostia is said to have been the architect. It consists of a rotunda with a noble Corinthian octastyle portico attached to it, and resembles in its general mass the Colosseum in the Regent's Park, London, except that the body of the latter building is a polygon of sixteen sides, and its portico (a Grecian Doric hexastyle) is only a single intercolumn in depth. That the portico of the Pantheon was erected by Agrippa, the son-in-law of Augustus, is testified by the inscription on the frieze: 'M. Agrippa, L. F. Cos. Tertium Fecit.' After being robbed of its rich ornaments, gilded bronze-work, and statues, it was consecrated as a Christian church in the seventh century. It is by far the largest circular structure of ancient times, the external diameter being 188 feet, and the height of the summit of the upper

cornice 102, exclusive of the flat dome, which makes the entire height about 148 feet. The portico, 108 feet wide, is octastyle, but there are in all 16 columns. The columns are 47 English feet high, with bases and capitals of white marble, and granite shafts, each formed of a single piece. The interior diameter is 142 feet, the thickness of the wall being 23 feet through the piers, between the exhedræ or recesses, which, including that of the entrance, are eight in number. The dome has a circular opening in the centre, 23 feet in diameter, which lights the interior completely. [DOME.]

PANTHER. [LEOPARDS.]

PANTOGRAPH, sometimes improperly written *Pentograph*, an instrument for copying maps, plans, and other drawings. It is formed of certain rules or bars jointed to each other, with tubes, in which may be fitted a tracer and a pencil. The copy may be made of the same size as the original, or smaller, as one fourth, one half, or in any other proportion. There are different forms of the instrument.

PA'NTOMIME, the name of a species of dramatic performance in which the actors express themselves by gestures. The name is composed of two Greek words, meaning 'imitation of everything.'

PANVI'NIO, ONU'FRIO, was born at Verona in 1529. He took at an early age the habit of the order of St. Augustin, and pursued his studies at Rome, whence he was called to Florence in 1554 to fill the chair of theology in that city; but soon afterwards obtained leave from his superiors to visit the chief cities of Italy in order to collect inscriptions. He finally settled at Rome, where he enjoyed the patronage of Cardinal Farnese. Having accompanied the Cardinal to Sicily, he died at Palermo in April 1568. Panvinio was a man of great learning and unwearied industry. His works, which are very numerous, chiefly relate to Roman antiquities. (Tiraboschi, *Storia della Letteratura Italiana*, vol. vii.)

PA'OLI, PASQUA'LE DE, was born in 1726 in the village of Rostino, in the island of Corsica. In 1734 his father Giacinto de Paoli, together with Giaffieri, was proclaimed their leader against the Genoese by the revolted Corsicans, but, after a struggle of several years, Giacinto was obliged to give up the contest. Giacinto and his younger son Pasquale, went to Naples, where the father obtained a commission in a regiment formed chiefly of Corsican emigrants, and the son was placed in the military college of that capital. On leaving college young De Paoli obtained a lieutenant's commission in the Neapolitan service; and in July 1755, was proclaimed captain-general of the Corsicans, who were again in arms against the Genoese. During twelve years he baffled all the efforts of the Genoese, who lost every part of the island, except the maritime towns of Bastia, Calvi, and San Fiorenzo. Paoli, after quelling an insurrection of his own countrymen, organised the island, and fixed its government and administration. He formed a legislative assembly, nine members, elected by the deputies, constituting the executive, of which Paoli was president, with the title of 'General of the Kingdom and Chief of the Supreme Magistracy of Corsica.' In 1760 Pope Clement XIII., at the request of Paoli, sent to Corsica a bishop with the title of Apostolic Visitor, in order to regulate the ecclesiastical affairs, which were in a state of confusion. This step, which had something of the appearance of a recognition of the independence of Corsica, greatly displeased the republic of Genoa, which offered a reward of 3000 crowns to any one who should arrest the bishop, forbidding all subjects of the republic to obey his mandates. The pope published an edict against the resolutions of the Genoese senate. The quarrel lasted for some years, and employed the pens of jurists and controversialists on both sides.

Genoa, despairing of ever recovering the sovereignty of Corsica, resolved on giving up the island to France. This was effected by the treaty of Versailles in 1768. Paoli loudly and eloquently appealed to all Europe against the cession, but no one interfered in favour of Corsica. The French landed a large force in Corsica, under the command of Count Marbœuf. The Corsicans fought desperately, and were at first successful, but in the following year large reinforcements came to the French from Toulon under General de Vaux. In May, 1769, a general battle took place, in which the Corsicans were completely routed near Pontenuovo. The French entered Corte, and overran the whole island. Most of the communes submitted to the conquerors. Paoli, with many followers, retired to Portovecchio, from whence he sailed in an English vessel for Leghorn. He afterwards repaired to England, where he remained till 1789, when Mirabeau moved in the National Assembly the recall of the Corsican patriots. Paoli then repaired to Paris, where he was received with acclamations, and in the hall of the Assembly he promised fidelity to France under the new order of things. He was presented to Louis XVI., who made him lieutenant-general and military commandant in Corsica. Paoli acted faithfully towards the constitutional monarchy of France; but when the violent revolutionists overthrew that monarchy, he separated himself from the French party. He was soon accused before that assembly, and his name was placed on the lists of proscription. Paoli now saw it was high time to declare himself. He assembled his countrymen, by whom he was appointed general-in-chief and president of the council of government. At the first declaration of war between England and France, he applied to the English commanders in the Mediterranean, and, with their assistance, drove the French garrisons out of the island. Soon after, a deputation of the consulta proceeded to London to offer the crown of Corsica to the King of Great Britain. The offer was accepted, and Paoli returned to England, where he lived in retirement for several years, on a pension which the British government allowed him. He died near London, in Feb. 1807. A volume of Paoli's letters has been published, which, with his spirited manifestoes, are his only literary remains.

PAOLO, SAN. [BRAZIL.]

PAPAL STATE, *Stato Pontificio*, called also

Stato della Chiesa, is the name given to the dominions belonging to the See of Rome, of which the Pope is the monarch. This state occupies the central part of Italy stretching across the Peninsula in an oblique direction from the Mediterranean to the Adriatic. Its greatest length, from north to south, is about 260 miles; the breadth varies from 20 to 120 miles. The area is 17,100 square miles. The population in 1844 was 2,908,915.

The Papal State consists, geographically speaking, of three great divisions: 1. The northern provinces stretch from the Tuscan Apennines to the Po and the Adriatic, the ground sloping to the north and north-east, and merging into the wide plain of Lombardy. These provinces are the four legations of Bologna, Ferrara, Ravenna, and Forli, and have a population of about 1,009,000 inhabitants. 2. This, which may be called the eastern division, extends from Rimini to the Tronto on the frontiers of Naples, a length of 110 miles along the coast of the Adriatic. It is bounded to the west and south by the central ridge of the Apennines, which separates it from the southern part of the Papal State, or the basin of the Tiber. It is generally designated by the name of the Marches, and the people are called 'Marchigiani;' but it is administratively divided into the provinces of Pesaro e Urbino, Ancona, Macerata, and Fermo e Ascoli, the united population of which amounts to about 900,000 inhabitants. 3. The third or southern division is the most important, because it contains the metropolis, and includes the classical land of Latium and the other provinces which formed the early territory of ancient Rome. It extends south of the central ridge of the Apennines as far as the coast of the Mediterranean, being bounded on the west by Tuscany and by the kingdom of Naples on the east. This fine region is now divided into the administrative provinces of Perugia, Spoleto e Rieti, Viterbo, Frosinone, and Rome, with a population of about 1,000,000 inhabitants.

The central ridge of the Apennines, which forms the watershed between the Adriatic and the Mediterranean, enters the Papal State from Tuscany north of Città di Castello, and runs through the state. It is described elsewhere. [Apennines.] The minor rivers which spring from this range are the Metaurus, Esino, Potenza, Tronto, Savio, Liris, and Sacco, which flow into the Adriatic; and the Chiascio, Topino, Nera, Velino, Savara, Maroggio, Nestore, Naia, Paglia, Chiana, Vezza, Corno, Salto, Turano, Treia, Ricano, Anio, Arrone, Galera, which flow either into the Tiber, or into the sea north or south of that river. The Tiber is the largest and most important river south of the Po. It rises at the foot of Monte delle Balse, in a deep dell of the Tuscan Apennines; after entering the Papal State it passes by the towns of Perugia, Lodi, Orvieto, and Orta, to Rome. The maritime navigation begins at Rome; eighteen miles below the city, the Tiber bifurcates: one branch enters the sea at Ostia, and the other at Fiumicino. With slight exceptions, the whole southern division of the Papal State, from the central Apennines to the sea, is included in the basin of the Tiber, which also comprises a considerable part of Abruzzo. The whole basin of the Tiber may include a surface of rather more than 10,000 square miles. The length of the river's course, with its windings, is about 200 miles.

The Papal State is now divided for administrative purposes into fourteen provinces, namely, Roma (Comarca di); Viterbo; Frosinone; Spoleto; Perugia; Macerata; Fermo; Ancona (Marca di); Pesaro e Urbino; Forli; Bologna; Ravenna; Ferrara; Benevento. The population is Roman Catholic, with the exception of about 10,000 Jews. The provinces, with the exception of that of Rome, are styled Delegazioni; and the representative of the sovereign, who is at the head of the administration, is styled delegate, and is always a church dignitary. If a cardinal, he is styled legate, and the province assumes the name of Legazione. The delegate or legate is assisted by a council, composed of four laymen, appointed by the pope. There is also in every province a provincial council for local and financial affairs. Every delegation or province is divided into districts, and every district into communes. Each commune consists of a town or large village, with the territory and hamlets belonging to it. A sort of constitutional government, of an imperfect kind, is kept up in each province. The ordinary revenue of the communes is derived from taxes levied upon provisions coming to market; and extraordinary deficiency is made up by a capitation tax and a tax upon cattle.

The universities are those of Rome, Bologna, Perugia, Ferrara, and Macerata. There are also 21 colleges or gymnasia, four at Rome, and the others in the chief towns of provinces. Females of the higher classes are chiefly educated in convents.

With regard to the central government, it is an elective monarchy; the pope for the time being is the absolute sovereign of the state; he consults the cardinals assembled either in special congregations, or, in cases of great importance, in general consistory, but he is not bound by their opinion. His two principal ministers are the cardinal secretary of state and the cardinal Camerlengo. The former superintends the department of foreign affairs and the home department. The cardinal Camerlengo is the finance minister. The governor of Rome is under the authority of the secretary of state, but is vested with great discretionary powers as to the police of the capital and its territory. The congregation or board called 'Sacra Consulta,' consisting of cardinals and prelates, superintends the administration of the provinces, and is also a court of appeal for criminal matters. A prelate and three general officers form a board for military affairs. The judicial department consists of a judge, called Prætor, for civil matters in the head town of every province; two courts of appeal, one at Rome and the other at Bologna; and a Court of Cassation, called La Segnatura, which sits at Rome. The ecclesiastical courts in each diocese judge of suits between clerical persons, and also between laymen who agree to bring their disputes before these courts. For criminal matters, there is a collegial court in every province, pre-

sided over by the delegate; and two courts of appeal, one at Rome and the other at Bologna.

The population of the Papal State is chiefly agricultural. A great extent of land is used for pasture. The exports are cattle, wool, cheese, lambskins, tallow, hemp, oil, some silk, vitriol, sulphur, pozzolana, potash, and cream of tartar. Manufactures, though not considerable, are gradually increasing. The maritime trade is chiefly conducted by foreigners. About 50,000 monks, priests, and nuns inhabit the Papal State.

Modern History.—The origin and formation of the sovereign state called the Papal State, which is annexed to the See of Rome, is one of the most obscure and intricate subjects in the history of modern Europe. The Bishop of Rome had a sort of municipal power in the city during the government of the country by the exarchs of Ravenna, and afterwards by the Longobards. In the beginning of the 8th century, the Roman citizens, headed by their bishop or pope, rebelled against an edict of the Emperor at Constantinople against image-worship; and the loose bond which had hitherto attached Rome to the Eastern Empire was dissolved.

Rome now governed itself as an independent commonwealth, retaining the title of duchy, having its senate, its consuls, and tribunes, and forming alliances with the dukes of Benevento and Spoleto, and with King Luitprand. The pope was generally the mediator or active promoter of these transactions. The popes soon found it necessary to have powerful support from some other quarter; and Pope Stephen III., after having crowned, by means of his legate, Pepin, king of the Franks, at Soissons, A.D. 751, conferred upon him the title of Patrician of Rome, which was the appellation of the officer who used to represent the Byzantine emperor in that city. Pepin, and after him Charlemagne, assisted the popes against the Exarchate and the Longobards.

Under the Carlovingians, Rome was an imperial city, with its municipal government and its senate; its territory or campagna was occupied by powerful nobles or barons, and the pope himself, in his temporal capacity, was the principal baron at Rome. The other provinces which now constitute the Papal State, such as Spoleto, Viterbo, Camerino, Fermo, &c., were in the possession of dukes or counts who were vassals of the crown of Italy. For four hundred years the emperor or king of Italy was considered as the sovereign of the whole country, and whenever he came to Rome he exercised his sovereign rights in that city as in the rest of Italy. But in his absence, the duchy of Rome, as it was still called, was often in a state of anarchy, its government fluctuating between a democracy and the power of the great feudal families. At times, too, the emperors deemed it necessary to put in their claims for dominant power. The great contest of Gregory VII. against the emperor Henry IV. had for its object to exalt the authority of the church over the civil power in general, and to assert at the same time the supremacy of the see of Rome over all other sees. During this contest the papal power received great additions by grants from some of the feudal proprietors.

Innocent III. was the first pope who really formed a Papal temporal State. Many of the Italian towns transferred their allegiance from the emperor to the pope. Rome and its duchy were still governed as a republic; but the Romans, becoming tired of their Senate, abolished it, and substituted, after the example of other Italian cities, a foreign elective magistrate, whom they styled 'the Senator,' and to whom they gave the powers till then enjoyed by the senate; they made him the head of the militia, and of the judicial administration; and they allotted the senatorial palace on the Capitol for his residence. This institution (with some alteration in its character) has continued at Rome to this day.

Rudolph of Habsburg, as Emperor, had power over the north of Italy in the latter part of the 13th century; while Charles of Anjou ruled in the south. These two monarchs came into collision, and the pope increased his own power by mediating between them. The removal of the papal see from Rome to Avignon, at the beginning of the 14th century, where it remained for 70 years, tended greatly to weaken the loose bond between it and the provinces of the church. Accordingly we find during that period a number of petty princes and tyrants settled in central Italy often at war either among themselves or against the Visconti of Milan; and it was not until after the exploits of Cola di Rienzo, and a bold policy on the part of Innocent VI., that the popes regained possession of the provinces. The popes returned to fix their court at Rome in 1371, and the government of the Papal State then assumed a more regular form, occasionally interrupted however by insurrections of the people of Rome. The Papal State assumed its definite form after many acquisitions of territory, in the 16th century. From 1797 till 1814 the Papal State was disarranged, and part of it was annexed to the French Empire. In 1814 the pope was restored to his dominions.

PAPA'VER, the name of a genus of plants the type of the natural family *Papaveraceæ*, of which one of the species is celebrated for yielding *Opium*. The history of this, like that of many other cultivated plants, is little known, or the time when it began to be cultivated for the sake of its inspissated juice, though it was well known to the Greeks, and cultivated at very early periods on account of its seeds. (Theophrastus, lib. ix., cap. xiii.)

The species of Papaver are twenty-five in number, but few are remarkable for any useful properties.

Papaver somniferum, or the White Poppy, is the species which yields Opium. It is a native probably of Asia Minor, but, having been so long cultivated, it is found wild in many parts of Europe. This species is distinguished by its obovate or globular capsules, which are smooth, as well as the calyx; stem smooth and glaucous; leaves embracing the stem incised and repand, with subobtuse teeth. There are two distinct varieties, which by some botanists are considered to be distinct species: the red-flowered and black-seeded is called by Gmelin *P. somniferum*, and

the white-flowered with white seeds, *P. officinale*. Both yield opium.

The juice of the poppy seems to have been used on account of its narcotic powers from a very early period, first in the East, of which it is a native, and afterwards in the West.

The mode of collecting the opium in Asia Minor is by puncturing the green capsule, and allowing the juice to exude, which is then scraped off, and deposited in small earthen vessels, and beat up with saliva. It is afterwards enveloped in dry leaves, and in this state is sold. In India the juice is mixed with oil obtained from the seed of the poppy, to hinder the rapid drying of the juice. The produce of the first incisions is of a light yellow colour; the others are fainter in odour and darker coloured. In general all three gatherings are mixed together, and sent to market in small baskets. The quantity obtained varies not only with the soil and mode of cultivation, but also with the season and the time of collecting. In wet, gloomy seasons not only is the quantity less, but it does not keep well; in such a case the proportion of *morphia*, the active principle of the opium, is also less. The quantity of morphia depends likewise very much on the time of gathering; if the harvest be postponed till the capsules begin to turn white and hard, it is greatly deficient; and by the time the capsules are mature and the seeds ripe, it has entirely disappeared. It is not, as in the case of many other vegetable alkaloids, transferred to the seeds, as they are altogether devoid of any narcotic principle, the oil which is obtained from them being bland and wholesome, and abundantly used as food.

The varieties of opium met with in commerce, are—1, Smyrna or Levant opium; 2, Constantinople opium; 3, Egyptian or Alexandrian opium; 4, Trebizond or Persian opium; 5, Indian opium; 6, English opium. The following constituents are found in all these kinds of opium:—1, morphia; 2, codeia; 3, paramorphia or thebaine; 4, pseudomorphia; 5, narcotina or opianum; 6, narceine; 7, meconine; 8, meconic acid; 9, an oily acid; 10, gum; 11, resin; 12, extractive; 13, a fixed oil; 14, caoutchouc; 15, an odorous principle; 16, ligneous matter with inorganic salts, such as sulphate of lime and potass, &c. There are also various accidental but more intentional impurities, such as sand, of which even the best Smyrna opium contains a large portion. The most important of those ingredients is morphia, but this varies in quantity in different specimens.

Good opium is not perfectly soluble in water; ⅛th generally remains undissolved, consisting of the caoutchouc and resin. Constantinople opium however leaves no residuum of caoutchouc. When opium is entirely soluble in water, it may be suspected to have been prepared by boiling the bruised capsules and leaves, and it is of a very inferior kind. The specific gravity of good opium is 1.336, if great mechanical impurities are not present. It is very inflammable, and burns with a clear flame, and forms a transparent alcoholic solution: opium from the bruised capsules is not inflammable, and forms a turbid alcoholic solution. When gum arabic or tragacanth is used to adulterate it, the specimen forms, when rubbed with one part of alcohol and two of water, a tremulous gelatinous mixture.

In estimating the effect of opium as a medicinal agent on the system, we may leave out of the question the action of all its other constituents, as morphia alone exists in any considerable quantity, and possesses all the peculiar qualities of opium.

Much disputation has taken place respecting the question, whether opium be a stimulant or a sedative; and most unnecessarily, as its action depends, in general, on the quantity taken, the frequency of repetition, and the state of the system when it is administered. That to persons in health, if the dose be small, it is a stimulant, seems unquestionable; and this is proved by the fact that the habitual opium-eaters consume it for the sake of its primarily stimulant effect, and not for the sake of the depression, languor, and suffering which succeed.

In small doses, such as from a quarter of a grain to one grain, opium generally acts as a stimulant, though in this respect the symptoms are not uniform.

Given in a full medicinal dose, such as from two to four grains, the stage of excitement is soon followed by that of depression. The pulse, which at first is increased in fulness and frequency, is afterwards reduced below the natural standard. The skin becomes hot, the mouth and throat dry, the appetite diminished, the thirst increased, and frequently nausea or even vomiting is induced. The symptoms of excitement soon pass away, and a state of torpor succeeds; the individual feels indisposed to exertion, the muscular system appears enfeebled, the force of impressions on the organs of the senses is diminished, and the ideas become confused. This state is followed by an almost irresistible desire to sleep, which is frequently attended by dreams, sometimes of a pleasing, at others of a frightful nature. These effects are usually succeeded by constipation (which may continue for several days), by nausea, furred tongue, headache, and listlessness. When opium is administered at once in a dangerous dose, the symptoms begin with giddiness and stupor, generally without any previous stimulus. The stupor rapidly increasing, the person becomes motionless and insensible to external impression; he breathes very slowly, generally lies quite still, with the eyes shut and the pupils contracted; and the whole expression of the countenance is that of deep and perfect repose. As the poisoning advances, the features become ghastly, the pulse feeble and imperceptible, the muscles exceedingly relaxed, and, unless assistance is speedily procured, death ensues. If the person recovers, the stupor is succeeded by prolonged sleep, which commonly ends in twenty-four or thirty-six hours, and is followed by nausea, vomiting, giddiness, and loathing of food.

The quantity which can produce a fatal effect in a person unaccustomed to its use is very small, even four grains; and in children, owing to the large quantity of blood which naturally goes to the brain, and the great impressibility of their nervous system, a very minute portion of opium,

or of its numerous preparations, open or disguised, can produce death.

Opium is frequently taken for the pleasurable effects it produces on the system. This practice is very common in Turkey and China. The habitual opium-eater is instantly recognised by his appearance. A total attenuation of body, a withered yellow countenance, a lame gait, a bending of the spine, frequently to such a degree as to assume a circular form, and glossy deep-sunken eyes, betray him at the first glance. The digestive organs are in the highest degree disturbed; the sufferer eats scarcely anything, and has hardly one evacuation in a week; his mental and bodily powers are destroyed,—he is impotent. By degrees, as the habit becomes more confirmed, his strength continues decreasing, the craving for the stimulus becomes even greater; and to produce the desired effect, the dose must constantly be augmented.

Although, as a national habit, opium-eating is confined to those countries mentioned, yet the practice is only too common among ourselves. In the cases of S. T. Coleridge and De Quincey we have seen this, and their published experience is sufficient to deter any one from venturing on the dangerous practice. The effects of opium-smoking are by no means so pernicious as those of opium-eating. The preparation which the opium undergoes seems to disarm it of much of its injurious property.

In the treatment of persons poisoned by opium, the first object is to empty the stomach, and as emetics can scarcely be made to act, the stomach-pump should be assiduously used. The next object is to obviate the disposition to sleep. This may be done by keeping the person walking about as much as possible, and also applying cold and heat alternately, perseverance in which will often rescue the patient from imminent danger. When all the opium is removed from the stomach, vinegar, or coffee boiled in vinegar, may be drunk at short intervals. Moderate venesection (if the pulse be full) is sometimes of service, and carrying on artificial respiration is a most beneficial measure. The subsequent constipation requires attention.

The officinal preparations of opium are numerous, and are fitted for different purposes. It is to be regretted that they are not of uniform strength, as this proves a source of inconvenience, as well as sometimes of danger. The great variation in strength of the Tincture of Opium (Laudanum), as found in the shops, has been pointed out by Dr. Christison, and even a greater difference is to be found in the Syrup of Poppies, which as generally sold is a feeble preparation, but in other instances so powerful as to prove, in the dose of a few drops, fatal to children. Numerous also are the instances of deaths from mothers and nurses administring nostrums, such as Godfrey's Cordial and other soothing medicines, the most potent ingredient in which is opium. Paregoric Elixir, though a weaker preparation than tincture of opium alone, or laudanum, differs much in strength. Some secret preparations in extensive use are, on the other hand, considerably stronger, such as the Black Drop, Battley's Sedative Liquor, and Jeremie's Sedative Solution, which last is much employed in India, and even in Britain.

The poppy is cultivated in many parts of Europe on account also of its seeds, which yield a bland oil much esteemed in France; and in this country, chiefly on account of the capsules, which are used medicinally.

The cultivation of the poppy is very simple, though the weeding requires care, and the plants must not be crowded too much together. They are carefully watered and manured, the watering being more copious as the period of flowering approaches, and until the capsules are half grown.

In India the cultivation takes place in the cold weather, that is, during the winter of Europe. The collection of opium is commenced very soon after the flowers fall, as the capsules rapidly enlarge.

PAPAVERA'CEÆ, so called from the genus *Papaver*, form a small natural order of Exogens. They consist for the most part of herbs, which are usually of only annual duration; but a few are shrubby, the most remarkable case of that kind being a genus called *Dendromecon*, a native of California, which is a true shrub with the aspect of a Cistus. The greater part of the species inhabit the temperate parts of the Old World; but a few also occur in Australia, at the Cape, and in South America. Their active qualities are usually deleterious, but are for the most part of little moment, except in the case of the *Papaver somniferum*, or Opium Poppy [PAPAVER], the properties of which have been already noticed.

PAPAW. [CARICA.]

PAPAYA'CEÆ, a very small natural order of Exogenous plants, consisting of the genus *Carica* alone. [CARICA.]

PAPENBURG, a flourishing little town of 3620 inhabitants, in the Hanoverian province of Osnabrück, is situated near the edge of the Saterland Moor, and about 7 miles from the right bank of the Ems, with which it is connected by a canal. The town contains two Roman Catholic churches, three schools, and between 400 and 500 houses. The inhabitants gain their livelihood chiefly by ship-building and trade. Besides saw-mills, sail-cloth, and rope manufactories, there are brandy distilleries and lime-kilns: the quantity of peat dug on the moors is very great, and it forms an important article of export to the ports of the Baltic and the German Ocean.

PAPER. In early times the materials used for writing upon were chiefly such as only required some little mechanical fashioning to fit them for that purpose. Smooth flat stones, clay afterwards burnt, waxed boards, plates of iron or metal, leaves and bark, skins and intestines, papyrus, and parchment, were all employed.

The art of making paper from fibrous matter reduced to a pulp in water appears to have been first discovered by the Chinese about the year 95 A.D. In the time of Confucius they wrote with a style, or bodkin, on the inner bark of the bamboo. The Chinese paper is made from the inner bark of the bamboo, but the Chinese also make paper from cotton and linen rags, and a coarse yellow sort for wrappers is made from rice-straw.

A person of the name of Tate is said to have

had a paper-mill at Hertford early in the 16th century; and another is stated to have been established in 1588 at Dartford in Kent, by a German, who was knighted by Queen Elizabeth. Great improvements were introduced in the manufacture by Thomas Watson, in 1713; but it was not till recent times that the manufacture reached any high degree of excellence.

In the making of paper any fibrous vegetable substance may be used, such as bark, stalks, tendrils, hop-bine, and wheat-straw. Nothing however has yet been found to answer so well as linen, hempen, or cotton rags. The sweepings of the cotton-mills are also much used.

In all kinds of paper-making, whether from the bark of trees or other fibrous matter, or from rags, the general process is the same. The fibrous material is cut and bruised in water till it is separated into fine and short filaments, and becomes a sort of pulp. This pulp is taken up in a thin and even layer upon a mould of wire cloth, or something similar, which allows the water to drain off, but retains the fibrous matter, the filaments o which are, by the process of reduction to pulp and subsequent drying and pressing, so interwoven or felted together, that they cannot be separated without tearing, and thus form paper.

The rags of our own country do not constitute a fourth part of the quantity which we use in making paper. Italy and Germany furnish the principal supplies.

In every paper-mill the first business is to sort the rags and cut them into small pieces. This is done by women, each of whom is provided with a large knife to cut the rags. Threads and seams are carefully put by themselves: if ground with the cloth, they would form specks in the paper. The rags, when cut, are thrown into five or six different compartments of a large chest, according to their qualities. Only the finest linen rags are used for the best writing-paper, but cotton as well as linen rags are now used for printing-paper. Hempen rags are used for coarse paper, and old cordage and tarred ropes for brown wrapping-papers.

The rags are now to be washed, which is done either with hot water in a fulling-mill, or they are subjected for some hours to the action of steam. The colour is taken out of them by a careful use of chlorine. The rags, after being washed, are subjected to the action of a revolving cylinder, the surface of which is furnished with a number of sharp teeth or cutters, which are so placed as to act against other cutters fixed beneath the cylinder. The rags are kept immersed in water, and subjected to the action of the cutters for several hours, till they are minutely divided and reduced to a thin pulp.

The pulp, or *stuff*, as it is technically called, is now ready to be made into paper, which is done either by hand or by machine. In the hand method, the stuff is put into a large vat, and is kept at a proper temperature either by a stove or steam-pipe, and the fibrous matter is held in suspension by stirring. The paper is made with a *mould* and *deckle*. The mould is a shallow square frame covered with wire-cloth, and a little larger than the sheet intended to be made upon it. The deckle is a very thin frame of wood which fits close upon the mould, and is required to retain the stuff on the mould, and to limit the size of the sheet. The dipper, or *vatman*, inclining the mould a little towards him, dips it into the vat with the deckle upon it, and lifts it up again horizontally. He shakes it to distribute the stuff equally, and the water drains through the wire. He lays the mould on the edge of the vat, and takes off the deckle, which he requires to apply to another mould. After remaining two or three seconds to drain, the mould is taken by another workman, the *coucher*, who, having deposited the sheet of paper upon a piece of woollen cloth, returns the mould to the dipper, who in the meantime has made another sheet, which stands on the vat ready to be couched upon another felt spread over the former sheet. Thus they proceed till they have made a pile of sheets, called a *post*, consisting of six or eight quires. This post, with its felts, is placed in the *vat-press*, and subjected to a strong pressure to force out the superfluous water, and to give firmness and solidity to the paper. The pile is then removed from the vat-press, the felts taken out, and the sheets are pressed again by themselves. They are then taken from the press and hung up, five or six together, in the drying-room.

Writing-paper is dipped, five or six sheets together, into a tub of size, and afterwards pressed to force out the superfluity. It is then hung up again in the drying-room. Printing-paper is sized in the stuff. Every sheet is now examined, imperfections removed, and bad sheets taken out. A large pile of paper is then made, and pressed with great force, to render the sheets quite flat and smooth. The pile is then taken down, sheet by sheet, and another made, by which new surfaces are brought into contact with each other, and the pile again pressed strongly. This operation, which is called *parting*, is done two or three times for the best papers. The paper is now counted into quires, folded, and packed up into reams.

The paper-making machine is constructed in such a manner as to imitate, and in some respects to improve, the processes used in making paper by hand. It is too complicated to admit of description without a large number of illustrations. The machine of Mr. Fourdrinier is the best that has been constructed; but Messrs. Dickinson and other makers have introduced improvements in particular parts of the apparatus.

Various wire-marks, or water-marks, as they are called, were formerly applied to paper to distinguish it. Hand-made paper is now commonly marked with the name of the maker, and the date of the year when it was made.

PAPER HANGINGS, a term applied (somewhat incorrectly) to the stained paper pasted against the walls of apartments, &c. The word Hangings was originally and properly applied to the woven or embroidered tapestry with which the walls of apartments were covered. From the time necessary for their production, these were too costly for any classes but the wealthy. About

200 years ago however, a mode was devised of printing or painting a pattern on sheets of paper, and pasting them against the walls of a room. These are Paper-Hangings, and they have greatly contributed to the comfort and cleanliness of domestic apartments.

There are three modes of producing the required device:—1. Wooden blocks are carved, representing in relief the outlines of the figure; an impression is taken from these blocks, and the device is completed by painting with a pencil. 2. A sheet of paper, leather, tin, or copper, is cut out into the required device, and laid on the paper to be stained; a brush, dipped in a coloured pigment, and worked over the surface of the perforated plate, conveys the pigment through all the perforations, and forms a pattern on the paper. 3. A block is carved for *each* of the colours to be employed, and an impression from all the blocks in succession fills up the design on the paper. The first of these modes is too slow and costly for ordinary use; the second produces imperfect outlines, and is now chiefly employed, under the name of *Stencilling*, to paint a pattern on the plaster walls of a room, without using paper-hangings; the third is the mode almost exclusively employed at the present day. Each block is furnished with small pins at the corners, by the aid of which the successive impressions are made to correspond properly. As many as seven or eight colours are sometimes employed in one pattern, and, generally speaking, there must be as many blocks as there are colours.

A reduction of the duty charged on all kinds of paper has had a considerable effect in extending the use and improving the manufacture of paper-hangings.

PAPER NAUTILUS, or PAPER SAILOR, or ARGONAUT. These are names generally applied to a cephalopod described by Aristotle, under the titles Ναυτίλος (Nautilos), and Ναυτικὸς (Nauticos), the *Argonauta* of Linnæus.

This animal has been from the earliest periods an object of great interest to zoologists, on account of the romantic accounts of its sailor-like habits handed down to us from the ancients—we need only refer to the accounts of Aristotle, Pliny, Ælian, Oppian, and others—and in consequence of the difference of opinion entertained with regard to the inhabitant of the shell by naturalists; some holding that the cephalopod found in it was a mere parasite, or, even worse, a pirate that had destroyed the legitimate owner and possessed himself of the shell; and others, that the animal was the lawful possessor and original constructor of it.

Among those who supported the former opinion were Lamarck, De Montfort, Ranzani, Poli, and De Ferrussac, to say nothing of Cuvier, the inclination of whose mind evidently was that the shell belonged to the animal, though he only designates the opinion of those who held the contrary as extremely problematical. Professor Owen appears to have been early inclined to this view of the subject. Dr. Leach, M. Rafinesque, M. de Blainville, and Mr. Gray, stand conspicuous among those who denied that the *Ocythöe* found in the shells of the genus *Argonauta* of Linnæus was the constructor of the shell.

The history of the Argonaut is now cleared up. In 1836 Madame Jeannette Power, though labouring under the erroneous idea that the animal 'spread to the wafting breeze a two-fold sail,' added greatly to our knowledge relative to this singular cephalopod. She proved first, that this cephalopodous mollusk is really the constructor of the shell which it inhabits; secondly, she cleared up certain doubts with regard to the first development of its eggs; and thirdly, she detailed new facts respecting its habits. ('Osservazione Fisiche sopra il Polpo dell' Argonauta Argo,' read before the Academy at Catania.) Two important points she ascertained, namely, the flexibility of the shell while tenanted by its living occupant; and its secretion by the velated tentacles or arms, which keep the shell firmly upon the poulp, or cephalopod.

In 1837 M. Rang, on his return from Algiers, where he had been observing these animals, had an interview with M. de Blainville, who had then the observations which Madame Power had just made in his hands; and, in April of that year, M. de Blainville read his elaborate Report, and afterwards published it, with additional dissertations, in the form of a memoir or letter, in the third number of the 'Annales Françaises et Etrangères d'Anatomie et de Physiologie.' His arguments in favour of parasitism appear to be based on the following data:—1, That the same species of cephalopod is not always found in the same species of shell. 2, That the natural position of the animal in the shell varies, the back of the animal being sometimes next the outer wall of the shell, sometimes next the involuted spire. 3, That the animal does not occupy the posterior part of the shell. 4, That the form of the animal and of its parts offers no concordance or analogy with the shell. 5, That the shell is too opake to have permitted the influence of light in the development of the coloured pigment in the mantle of the cephalopod of the Argonaut. 6, That it is very far from being true that the Argonaut-shell possesses the flexibility and elasticity requisite to harmonise with the locomotive and respiratory movements of the animal. 7, That the animal suffers no appearance of inconvenience when deprived of its shell. 8, That a cephalopod has been discovered in the Sicilian seas like that which inhabits the Argonaut, but without a shell. These data are designated by Professor Owen, to whose observations we shall presently advert, as false facts, with the exception of the third, which is only partially false, being true when stated with reference to the more mature animal only. The other arguments of M. de Blainville are noticed by Professor Owen as founded on undoubted or admissible facts; but the Professor denies the conclusion drawn by M. de Blainville.

M. Sander Rang, in consequence of the appearance of M. de Blainville's memoir or letter, published in Guerin's 'Magasin de Zoologie' a very interesting paper under the title of 'Documents pour servir à l'Histoire Naturelle des Cephalopods Cryptodibranches.' In this memoir M. Rang's

observations are confirmatory—1, of Madame Power's statement that the siphon is applied to the part of the shell opposite the involuted spire; 2, of the accuracy of her description of the relative position of the so-called sails of the Argonaut with reference to the shell; 3, of her discovery of the faculty possessed by the animal of repairing the shell, and many other points.

In February, 1839, a highly interesting and valuable series of specimens of the Paper Nautilus (*Argonauta Argo*) consisting of the animals and their shells of various sizes, of ova in various stages of development, and of fractured shells in different stages of reparation, were exhibited to the Zoological Society of London, and commented on by Professor Owen, to whom they had been transmitted for that purpose by Madame Power, who had formed the collection in Sicily, in 1838. In the course of his comments the Professor went at large into the subject, and in addition to the observations above alluded to with regard to the alleged false facts and admissible facts whereon M. de Blainville had founded his reasoning, combated at great length, and, in our opinion, with signal success, the arguments of those who adhered to what may be termed the parasitic opinion; and recapitulated as follows the evidence which, independently of any preconceived theory or statement, could be deduced from the specimens then on the table.

1, The cephalopod of the Argonaut constantly maintains the same relative position in its shell.

2, The young cephalopod manifests the same concordance between the form of its body and that of the shell and the same perfect adaptation of the one to the other as do the young of other testaceous mollusks.

3, The young cephalopod entirely fills the cavity of its shell. The fundus of the sac begins to be withdrawn from the apex of the shell only when the ovarium begins to enlarge under the sexual stimulus.

4, The shell of the Argonaut corresponds in size with that of its inhabitant, whatever be the differences of the latter in that respect. (The observations of Poli, of Prevost, of King, and of Owen, are to the same effect.)

5, The shell of the Argonaut possesses all the requisite flexibility and elasticity which the mechanism of respiration and locomotion in the inhabitant requires; it is also permeable to light.

6, The cephalopod inhabiting the Argonaut repairs the fractures of its shell with a material having the same chemical composition as the original shell, and differing in mechanical properties only in being a little more opaque.

7, The repairing material is laid on from without the shell, as it should be according to the theory of the function of the membranous arms as calcifying organs.

8, When the Argonaut has reached an advanced stage of development *in ovo*, neither the membranous arms nor shell are developed.

9, The shell of the Argonaut does not present any defined nucleus.

Several species are known, natives of the warmer seas.

PAPHLAGO'NIA, a province of Asia Minor, was bounded on the N. by the Euxine, on the S. by the part of Phrygia afterwards called Galatia, on the E. by Pontus, and on the W. by Bithynia. It was separated from Bithynia by the Parthenius (Olu or Bartan), and from Pontus by the Halys (Kizil-Ermak), which was also its eastern boundary in the time of Herodotus (i. 6, 72). Paphlagonia is traversed by two parallel mountain-ranges, which run from east to west; the country between these ranges is drained by the Amnias (Kara-su), a branch of the Halys. Crœsus subdued the Paphlagonians, and they afterwards formed a part of the Persian Empire. It subsequently formed a part of the kingdom of Pontus; and under the Roman Empire it was united as a province to Galatia. The chief town was Sinópe (Sinub), a Milesian colony, situated on a peninsula on the coast, once a most flourishing commercial town. It was taken by Lucullus during the Mithridatic war, and afterwards was made a Roman colony. West of Sinópe were Hármene, Abonteichos, and Amastris, which is described by Pliny as a beautiful town in his time. In the interior was Pompeiolis, founded by Cn. Pompeius, after the conquest of Mithridates, on the river Amnias.

PAPHOS. [CYPRUS.]

PAPIER-MÂCHE', the French term for a preparation of moistened paper, of which many articles are manufactured in England, France, and Germany. Two modes are adopted of making articles of this kind: 1, by glueing or pasting different thicknesses of paper together; 2, by mixing the substance of the paper into a pulp and pressing it into moulds. The first mode is adopted principally for those articles, such as trays, &c., in which a tolerably plain and flat surface is to be produced. Common millboard, such as forms the covers of books, may convey some idea of this sort of manufacture. Sheets of strong paper are glued together, and then so powerfully pressed that the different strata of paper become as one. Slight curvatures may be given to such pasteboard when damp by the use of presses and moulds. Papier-Mâché, properly so called, however is that which is pressed into moulds in the state of a pulp. This pulp is either paper-maker's pulp, or is more generally made of cuttings of coarse paper boiled in water, and beaten in a mortar till they assume the consistence of a paste, which is boiled in a solution of gum-arabic or of size, to give it tenacity. The moulds are carved in the usual way and the pulp poured into them, a counter-mould being employed to make the cast nothing more than a crust or shell, as in plaster casts.

PAPI'LIO, a genus of Lepidopterous Insects, established by Linnæus, and divided by subsequent entomologists into many groups and genera. It includes that very natural and beautiful assemblage of insects popularly known as Butterflies. The first section of *Lepidoptera*, named *Rhopalocera* (club-horned) in the arrangement of Boisduval, and *Diurna* in that of Latreille, corresponds with the Linnæan genus *Papilio*. The insects composing it have mostly thin and elongated antennæ, terminated by a

club. They are all day-fliers. Their larvæ, which are variously shaped, have six pectoral, eight abdominal, and two anal feet. The pupæ are usually angulated, and, with a few exceptions, naked. The perfect insect varies in size from less than an inch across the wings when expanded, to nearly a foot in breadth. Equally variable are their colouring and outlines. They are short-lived. Their powers of flight are very great, and the mode of flight varies in the several species. The males are usually more gaily coloured than the females.

The arrangement according to natural relations of the species of butterflies has been attempted by many naturalists. Even in the time of Linnæus the number and variety of known species was such as to render it necessary to subdivide his great genus *Papilio*. He constituted five principal groups. In the first of these, named *Equites*, he included such butterflies as have the fore wings longer from the posterior angle to the apex than to the base. In the second, the *Heliconii*, the wings are narrow, entire, and often almost naked. The *Danai* had also entire wings. The *Nymphales* have dentated wings; and the group of *Plebeii* was composed of small species, whose larvæ are usually short and thick.

Dr. Horsfield has proposed an arrangement of these insects into five groups or stirpes, characterised by the peculiarities of the larvæ. He names the first stirps, *Vermiform*, the second *Iuliform*, the third *Scolopendriform*, the fourth *Thysanouriform*, and the fifth *Anopluriform*.

Perhaps the most valuable arrangement of the diurnal *Lepidoptera* is that proposed by M. Boisduval, who divides them into three great sections and fifteen tribes, founding his classification upon the characters of the larva.

PAPILIONA'CEÆ, a fanciful name given to the principal division of Leguminous plants, from an imaginary resemblance between their flowers and a *Papilio*, or butterfly. The garden pea affords an example of the structure of the flowers, in which the back petal is named the *vexillum*, or standard, the two external of the side-petals *alæ*, or wings, and the two interior petals, which adhere by one edge, the *carina*, or keel.

PAPINIA'NUS, ÆMI'LIUS, was a pupil of the jurist Q. Cervidius Scævola at the same time with Septimius Severus, afterwards emperor. Under the Emperor Marcus Aurelius he held the office of advocatus fisci, in which he succeeded Septimius Severus. After Severus became emperor, Papinian was his libellorum magister, and præfectus prætorio. Paulus informs us that he had given an opinion before Papinian in his auditorium. ('Dig.' 20, tit. 5, s. 12; 'Dig.' 12, tit. 1, s. 40.)

Severus was always on intimate terms with Papinian, and on his death at York, recommended to him his two sons Caracalla and Geta. Caracalla murdered his brother, and shortly after put to death Papinian, together with Papinian's son, who was quæstor. No Roman jurist was held in higher estimation than Papinian. The 'Digest' contains excerpts from his 37 books of Quæstiones, his 19 books of Responsa, and other works.

PAPI'RII, the name of a patrician and plebeian gens in ancient Rome, who were formerly called Papisii. This gens contained several families, such as the Mugillani, Crassi, Cursores, and Massones. The most celebrated of the different individuals of these families was *Lucius Papirius Cursor*, who was the grandson of L. Papirius Cursor, who was censor in the year in which Rome was taken by the Gauls, and son of Spurius Papirius Cursor, who was military tribune in B.C. 379. L. Papirius Cursor was master of the horse to L. Papirius Crassus, who was created dictator B.C. 339, by the consul Manlius, in order to carry on the war against the Antiates. The time of his first consulship is doubtful. It was during his consulship that the Lex Poetelia in favour of debtors was passed. He was appointed, probably the year after his consulship, Dictator, for the purpose of carrying on the war against the Samnites. (Liv. viii. 29-37.) He was afterwards again consul, B.C. 320; and he filled this high office at least four times. When Dictator a second time, B.C. 309, he defeated the Samnites, and had a triumph. He was one of the most illustrious men of his age.

PAPI'RIUS, SEXTUS or PUBLIUS, is the collector or supposed collector of the old Leges Curiatæ, or as they are sometimes called, Leges Regiæ, which were enacted at Rome during the kingly period. This Papirius is said to have been Pontifex Maximus, and to have lived under the last Tarquin. The collection is mentioned under the name of Jus Papirianum (Pomponius, 'Digest' 1, tit. 2, s. 2, § 2); and sometimes it is called Lex Papiria.

PAPI'RIUS, JUSTUS, a Roman jurist, who lived under Marcus Aurelius and survived him. He compiled twenty books of Constitutions. There are sixteen excerpts from this work in the Digest.

PAPIST. [ROMAN-CATHOLIC CHURCH.]

PAPPUS, ALEXANDRI'NUS, an eminent mathematician of Alexandria, who flourished about the end of the fourth century of our æra. In the very brief accounts we have of him, he is mentioned as the author of several treatises, all of which, except his 'Mathematical Collections' (*Μαθηματικαὶ Συναγωγαί*), probably the most valuable of his writings, appear to have perished. The original Greek, except some short extracts, has never been printed; and the only translation of it, which is by Commandine, was first published at Pesaro in 1588; and another edition, with little variation or improvement, was printed in 1660 at Bologna. Independently of its geometrical value, the work of Pappus abounds in matters of importance to the history of the science.

PAPPUS is a peculiar form assumed by the calyx of certain flowers chiefly of the natural order *Compositæ*. The down of the Dandelion is a familiar instance of pappus in a state of beautiful division resembling fine feathers.

PA'PUA, commonly called *New Guinea*, is an island of great extent, situated at the junction of the Indian and Pacific Oceans. It is separated by Torres Strait from the northern extremity of Australia; by the Strait of Gallowa from the small island of Sallawatty, which lies farther west; and

by Dampier's Strait from New Britain, which is to the east of it. It extends from 0° 19′ to 10° 3′ S. lat., and from 130° to 148° 30′ E. long. Its length, E.S.E to W.N.W., is nearly 1300 miles. Its width varies from 18 miles to 500 miles. The main body of the island, east of 135° E. long., constitutes a vast extent of continuous land, with a projecting peninsula at its eastern extremity, but between 135° and 133° E. long., a wide and open bay enters deeply into the land. This bay, called Geelwink, or Great Bay, is nearly 200 miles wide at its entrance, in which some islands of considerable extent are situated, and penetrates about 200 miles southward into the body of the island. The island has been visited by so few Europeans, that little is known of its interior. It appears however to contain some very lofty mountains, whence considerable rivers flow into the sea. The productions are as little known as the physical geography.

Papua is inhabited by two or perhaps three nations. Along the coast of the western half of the island are the *Papuas*, who have received that name from the Malays; in which language the word signifies 'frizzled hair.' They are considered to belong to the same race as the inhabitants of Australia. The other chief tribe, the *Haraforas*, inhabit the interior of the western half of the island, but in the eastern district they seem to be in possession of the shores. They live in huts, built between the branches of high trees, to which access can only be had by a ladder, which is drawn up during the night. They are said to be distinguished from the Papuas by a lighter colour, straight hair, and greater strength and activity of body. The Papuas engage to some extent in trading and fishing; the Haraforas in agriculture.

The Portuguese discovered the western part of Papua soon after they had settled in the Moluccas, between 1512 and 1530. The Spaniard Saavedra visited it in 1528. Several other navigators discovered other parts of the coast. In modern times Kolff, a Dutchman, has discovered and surveyed the south-western coast; and on his report respecting the advantageous trade which may be carried on with this island, the Dutch government founded a colony, and erected, in 1828, a small fortress on a spacious bay, called Triton's Bay. The fortress, which is called Dubus, is situated in 3° 42′ S. lat., and 134° 15′ E. long.

PAPY'RUS, in botany, is a Cyperaceous aquatic plant, whose soft cellular flower-stem afforded the most ancient material from which paper was prepared. It is usually regarded as a species of *Cyperus*, and is called *C. Papyrus*; by a few botanists it is considered a distinct genus, and is named *Papyrus Antiquorum*. It is a very common plant in Abyssinia, Egypt, and Syria, and is also met with in Calabria and Sicily. It inhabits both stagnant waters and running streams. The roots are sweet, and have been employed as food.

PAR OF EXCHANGE. [EXCHANGE.]

PARA', or, *Santa Maria de Belem do Gram Pará*, a town in Brazil, situated in 1° 18′ S. lat., 48° 22′ W. long., is built on the right bank, and about 70 miles from the mouth of the Rio do Pará, which river is about 7 miles wide opposite the town. This extensive sheet of water contains numerous low and woody islands, many of which are connected with one another by banks of mud, with only a few feet of water on them. The navigable channel is winding, and the approach of vessels to the town is difficult and tedious. On the south side of the town is the Rio Guamá, a considerable stream, which joins the Rio do Pará by a westerly course. The streets of Pará are wide and straight, and intersect one another at right angles. The houses are chiefly built of stone, but rarely consist of more than two stories. They are whitewashed, and frequently without glass windows. The cathedral is large and has a fine appearance. The best edifice in the town is the former College of the Jesuits, now the residence of the bishop of Pará: a part of the building is occupied by a theological college. The church contiguous to the college has been converted into an hospital. The palace of the governor and the custom-house are also good buildings. In 1820 the population was estimated at 24,500, but in consequence of the disturbed state of the country and the massacres committed by the Indians in 1834 and 1835, the number of inhabitants has greatly diminished, and is said to have dwindled down to about 6000. Some of the buildings mentioned above have suffered greatly or been entirely demolished. Pará exports sugar, rum, molasses, coffee, cacao, cotton, vanilla, copaiba, pitch, copal, fustic, timber, wood for cabinet-work, tobacco, ropes made of palm-fibre, sarsaparilla, rice, mandioc, starch, India-rubber, pechurim-beans, tonquin-beans, tamarinds, cassia, indigo, arnotto, Brazil nuts, hides, horns, and horses. It sends several articles of European manufacture by way of the Amazonas and Rio Tapayos to the province of Matto Grosso, from which it receives gold in exchange.

PARABLE (παραβολὴ, 'a comparison or similitude') is defined by Bishop Lowth as 'a continued narrative of a fictitious event, applied by way of simile to the illustration of some important truth.' ('Prælect.,' x.) It is a species of fable, and differs from the apologue by narrating events which, though fictitious, are not impossible to have happened. [FABLE.] This mode of instruction is of great antiquity, especially among the eastern nations. In the Old Testament we have examples of it in the parable of Nathan to David. (2 Sam., xii. 1–9.) In the New Testament parables form a most marked feature of our Saviour's teaching.

PARA'BOLA, one of the Conic Sections. It is the curve described by a moving point which is always at the same distance from a fixed line (its *direction*) that it is from a fixed point (its *focus*).

In applied mathematics the parabola was formerly of great importance, both as being the curve in which a comet was supposed to move, and as that in which a cannon-ball or other projectile would move were it not for the resistance of the air. It is still sometimes used as the approximation to the elongated ellipse in which a comet moves.

PARABOLOID. The simplest form of this surface is the paraboloid of revolution, made by the revolution of a parabola about its axis.

PARACE'LSUS, the name commonly given to a very extraordinary person, who called himself by the compound and high-sounding appellation *Philippus Aureolus Theophrastus Paracelsus Bombast, ab Hohenheim;* to which is sometimes added the epithet *Eremita*. Of all these names it is difficult to say which, if any, really belonged to him; for though he seems to have liked *Theophrastus* better than any of the others, and sometimes (as in his will and his letter to Erasmus) called himself by that alone, and though he says, in his book called 'Paragranum,' 'Et Naturæ et Baptismatis jure Theophrastus nominor,' still he was wont to pay so little regard to truth, either in his words or actions, that he cannot safely be believed even in such a trifle as this. The place of his birth is equally uncertain, but he is generally supposed to have been born, in 1493, at Einsiedeln, in the canton of Schwyz, the Latin name of which, 'Helvetiæ Eremus,' caused him to be sometimes called 'Eremita.' His father was a physician, and instructed him in alchemy, astrology, and medicine; but he was never regularly educated, and he confesses himself that he was not fond of books and had a horror of languages, insomuch that at one time he did not open a book for ten years together. This is quite confirmed by the internal testimony of his writings, which are as unintelligible from their style as their substance. He soon commenced a wandering life, and spent some years in travelling over almost all Europe and probably several parts of Asia and Africa. He had a most ardent desire for information of all sorts, and neglected no opportunity of acquiring it; but he seems to have exercised very little judgment in the choice of his informants, and to have consulted conjurors, old women, and quacks of every description, quite as much as physicians and philosophers. The most valuable acquisition which he made in his travels was an acquaintance with metallic chemistry, by means of which he was enabled to perform several wonderful cures, and thereby laid the foundation of his fame. In 1526 he was chosen to be professor of medicine and natural philosophy at Basel, and commenced his course of lectures by lighting some sulphur in a brazen chafing-dish, and then threw into the flame the works of Galen and Avicenna, exclaiming 'Sic vos ardebitis in Gehennâ.' He lectured partly in Latin and partly in German, which, together with his singular manners and the novelty of his opinions, rendered him extremely popular. In consequence however of a dispute with the magistrates about the amount of a fee which he demanded of one of the canons, he left Basel in about a year, and recommenced his wandering life. He seldom stayed long in one place, but lived chiefly in taverns; and though he had hitherto lived a very temperate life, and taken nothing but water, he now spent whole nights in drinking with the lowest company. He still maintained his reputation by occasionally effecting some extraordinary cures by means of his powerful medicines, but his failures were equally conspicuous. At last, after passing through many vicissitudes, the boasted possessor of the philosopher's stone and the elixir of life died in great poverty in 1541, at Salzburg, in the Tyrol, at the early age of 48.

His works, part of which are written in German and part in Latin, and of which a complete list is given by Haller, in his 'Biblioth. Medic. Pract.,' were published in Latin at Frankfort, 1603, in 10 vols. 4to, and in German, by Huser, at Basel, 1589-90, also in 10 vols. 4to.

PARACENTRIC, or 'towards the centre,' a term sometimes used, as in Paracentric Velocity, which means the rate at which a moving body approaches a certain centre without reference to the rate at which it moves in space.

PARACHUTE, a French word, signifying a means of preventing a fall. The first part of the word, *para*, is of Greek origin; the second part is the French word *chute*, a fall, which is of Latin origin.

A parachute is a machine attached to a balloon, and is intended to convey the aëronaut gently to the earth, in case of an accident happening to the balloon. It is in shape like an umbrella, with ropes or stays fastened to the extremities of the whalebones, and brought down to the handle, where they must be fixed, so as to prevent the umbrella from turning inside outwards. Instead of the stick, suppose a metal tube to be fixed in the centre, with a rope passing through it, attached by its upper extremity to the balloon, and by its lower end to a tub or car. This machine is a parachute. While ascending, it will be like a closed umbrella, but it may at any moment be detached from the balloon by cutting the end of the rope which ties it to the car; the resistance of the air will then cause it to expand, and will at the same time retard the velocity of descent.

Machines, like umbrellas, to break the fall from a high place, were used in Sinm two centuries since: but the first experiment in Europe with such a machine was made at Paris in 1783 by M. le Normand, who leaped safely from a window of a house with a stout umbrella of thirty inches in diameter in his hand. M. Blanchard several times caused dogs to descend from great heights by means of parachutes; and, in 1802, M. Garnerin, who five years before had made a like descent at Paris, repeated the experiment in London. The parachute of this gentleman was 23 feet in diameter; and, at the height of 8000 feet, he cut the rope which attached him to the balloon. The descent was at first very rapid; but, the machine at length expanding, he came to the ground without serious injury. Miss Garnerin, his daughter, descended twice in 1816, from great elevations, apparently without being in the least discomposed.

In 1837 Mr. Cocking descended near London, from a balloon, by a parachute constructed in the form of an umbrella turned upside down. The parachute was 34 feet in diameter, and it was kept open by a wooden hoop. As soon as it was cut away, it fell with rapidity; its vibrations were violent, the hoop broke, and the unfortunate aëronaut fell, dreadfully mutilated, to the ground.

The formula

$$v = 28.28 \sqrt{\frac{w}{d^2}}$$

may serve to determine the velocity of descent in a parachute: w denotes the weight of the machine in pounds avoirdupois; d its diameter in feet, and v the required velocity in feet per second.

PARACYANOGEN, a compound formed of $C^2 N^1$. It is soluble in sulphuric and nitric acids, and is identical in composition with cyanogen.

PARADISE (*παράδεισος*) is a word of Persian origin, signifying a kind of park or pleasure-ground inclosed with walls, and well watered and planted, and stocked with animals for the chase. (Gellius, ii. 19.) It was adopted into the Greek language, and applied to any pleasant place. The Septuagint translators use this word for the Garden of Eden, where God placed the first man upon his creation. (Gen. ii. 8; iii. 23.) Paradise, in the New Testament, is used for the abode of the departed spirits of the good between death and the resurrection.

PARADISCA. [Bird of Paradise.]

PAR'ADOX (from *παράδοξος*, 'contrary to received opinion') is a term applied to a proposition which is opposed to the general belief, or to one which appears at first sight to contradict some previously-ascertained truth. The word was used by the Greeks to signify a remarkable saying. Cicero, in his work entitled 'Paradoxa,' illustrates six Stoical paradoxes; one of which may serve as an example, 'The wise man alone is rich.'

PARAGUAY is a republic of South America, situated nearly in the centre of that continent, between 20° and 27° 30′ S. lat., 55° and 62° W. long. It extends in length from S. to N. about 500 miles, and its average width may be about 200 miles. On its western side flows the river Paraguay; on its E. and S. the Paraná; on the N. it is bounded by Brazil.

The northern part of the country is mountainous. The Sierra Amambahy and the Sierra Maracaju intersect it and inclose a wild and rugged country, watered by rivers, interrupted by cataracts and rapids. The remainder of Paraguay, or that part which is situated south of 24 S. lat., is one of the most fertile and pleasant countries of South America. The greater part of the surface is a succession of hills and gently-sloping eminences, and broad open valleys intersected here and there with lakes. The lower grounds and plains are in some tracts savannahs, and afford excellent pasture ground.

The two rivers which inclose Paraguay on three sides differ greatly in their character as navigable rivers. The Paraguay is navigable in all its extent within this country. The Paraná, which runs along the eastern side of the country, is much less favourable to navigation. The great cataract, called Salto de Sette Quedas, near 24° S. lat., forms an insuperable impediment to navigation. Some of the smaller rivers which join the Paraguay are navigable to a short distance from their junction with it, but one of them, the Tibiquari, is navigable above a hundred miles.

Paraguay enjoys the advantages of the intertropical rains. The principal articles cultivated as food are maize, batatas, mandioc, yucca-root, and beans. The cultivation of the sugar-cane, tobacco, and cotton is rather extensive. The principal fruit-trees are orange-trees and fig-trees. The timber-trees, gum-trees, and dye-woods, are numerous and valuable. The number of horses, mules, and cattle is not great, but it is sufficient for the internal consumption. Most of the animals peculiar to South America are found in this country.

The population of Paraguay probably exceeds 1,000,000. In a few of the towns and their vicinity live a comparatively small number of whites, and a larger number of mestizos, or descendants of Spaniards and Indians; but the chief inhabitants are the Guaranis, one of the most civilized of the native tribes of America.

The republic is divided into eight departments, called, after their capitals, Asuncion, Concepcion, Santiago, Villarica, Curuguaty, Candelaria, San Fernando, and Santa Hermengilda. The capital of the republic is *Asuncion*, which is built near the banks of the river Paraguay. The town consists only of one street of considerable length, on each side of which are several lanes, and a great number of small houses, standing apart, and surrounded by groves of orange-trees. Most of the houses are small, even in the principal street, and consist only of a little shop with two or three apartments attached to it. The cathedral is a building without any pretensions. The best buildings of the town are a few convents. The inhabitants are mostly the descendants of Europeans and Indians. There are a few negroes, but not many mulattoes among them. The population amounts to about 10,000. Some of the other towns are said to contain from 2000 to 4000 inhabitants, as Villa Reale de Concepcion, Villarica, Curuguaty, Cazapá, and Neembucu. The commerce of the republic with foreign countries is very small.

The Spaniards colonized Paraguay at different periods in the 16th century; and Jesuits were sent to those parts for the purpose of converting the natives to Christianity. Their success was not great until they obtained from the Spanish court a mandate (about 1690), forbidding all other Spaniards to enter their Missiones without their permission. When the Jesuits were expelled, in 1767, the Missiones were inhabited by more than 100,000 civilised Indians, of whom perhaps less than half the number were in Paraguay. In 1810, when a government was constituted in Buenos Ayres independent of the then existing authorities in Spain, Paraguay refused to acknowledge this government, and set up a republic for itself. Dr. Francia became dictator of this republic in 1814, and ruled with despotic power till his death in 1840; since which time the republic has been governed by a Directory. During Francia's dictatorship every kind of communication with other countries was cut off.

PARAGUAY TEA. [Tea, Paraguay.]

PARAHYBA, a river in Brazil, which drains the country inclosed on the south by the Serra do Mar, and on the north by the Serra de Mantequeira, and comprehending the province of Rio de

Janeiro. *It rises* near 44° 30′ W. long., and flows westward through the province of Saõ Paolo, for about 100 miles; it then turns N.E. near Escada, below which it runs E.N.E. with a rapid current through a valley inclosed by Serras, until it falls into the Atlantic about 20 miles north of Cape de San Thome, near 41° W. long. Its course in this valley exceeds 400 miles, so that it runs altogether above 500 miles. There is a thriving commercial seaport town of 6000 inhabitants at the mouth of this river, called San Joaõ de Parahyba. The Parahyba is navigable for large river craft for 50 miles from its mouth; the upper navigation is interrupted by rapids and falls. The valley of this river is still in its natural state, being covered with trees of high growth, which more than in any part of Brazil exhibit that vigorous vegetation by which the maritime districts of that empire are distinguished. Cultivation has made but little progress, except in the wider portion of the valley, between Escada and Pendamonhangaba, where Indian corn, mandioc, sugar-cane, and tobacco are grown; for the cultivation of these the climate and soil seem very favourable.

PARALLACTIC INSTRUMENT, or *Ptolemy's Rules*, the name given to an instrument invented by Ptolemæus for determining the moon's parallax, and described by him, 'Almagest,' b. v., c. 12.

Sometimes the word *Parallactique* is used to signify the instrument known to us by the name of Equatorial. Lalande says the proper word is *Parallatique*, or that which follows the *parallel* of stars. He reserves *Parallactique* for *Ptolemy's Rules*.

PARALLAX (παράλλαξις), used in astronomy generally for the angular variation in the position of an object caused by the eccentric situation of the observer with respect to a certain point of reference. Thus the parallax of the moon, sun, planets, comets, is the difference between the position of any of those bodies as seen from the surface of the earth and that in which they would be seen if the observer were placed at the earth's centre. The parallax of the fixed stars is the difference between their places as seen from the earth and from the sun, which is for these observations the point of reference. All bodies within the solar system are in the first instance referred to the earth's centre; while those beyond our system, as the fixed stars, are referred to the centre of the sun, and the change arising from eccentric position in each case is called parallax.

From the effects of parallax we derive all our knowledge of the distance and magnitude of the bodies which are visible in the heavens.

The first attempt to determine the sun's distance seems to be due to Aristarchus of Samos, and presupposes the knowledge of the moon's parallax. On drawing a figure, it will immediately be seen that when the moon has completed her first quarter (she is then said to be *dichotomized*, or cut exactly in two), the sun, moon, and spectator form a triangle, which is right-angled at the moon. Now the angle which separates the sun from the moon can be observed at the same instant: suppose it = E, we have — Distance earth and sun = distance earth & moon × sec. E.

The exact moment of *dichotomy* cannot be noted with much accuracy; yet repeated observations would show that the sun was far more distant than the moon. The ancient astronomers seem to have estimated the sun's parallax to be from 2′ to 3′, which suffered a gradual reduction as the means of observation improved.

The discoveries that the planets move in ellipses round the sun in the focus, that the area swept by each radius vector in a given time is a constant quantity for the same planet, and lastly, that the squares of the periodic times are as the cubes of the mean distance, have supplied means for a much more accurate determination of the sun's parallax. Assuming these laws, the forms of the orbits of the earth and planets and their relative distances can be determined from observation; hence, if the parallax of any one planet can be found, the parallaxes of the sun and of all the other planets can be computed.

The observation however by which the parallax of the sun is determined with the greatest certainty, is that of the passage of Venus over the sun's disc, commonly called the Transit of Venus.

The mean equatorial horizontal parallax of the sun, according to Encke, = 8.5776″ Its true value for every ten days is given in the 'Nautical Almanac' at the end of the Ephemeris of the sun and moon. The equatorial horizontal parallax of the moon for mean noon and midnight is at page III. of each month, and the parallaxes of the planets are in the last column of the Planetary Meridian Ephemeris.

PARALLAX, ANNUAL, is the angle under which the earth's orbit is seen by a superior planet.

PARALLAX OF THE FIXED STARS. When Copernicus proposed his hypothesis of the earth's motion, one striking astronomical objection was, that the enormous displacement of the spectator's place which his system supposed was not supported by a corresponding change in the positions of the fixed stars. Every improvement in instruments, in the art of observing, or in the science of computation, seemed to increase the distance of the sun, and consequently the orbit of the earth, and still no sidereal change could be detected. Hence, until the discoveries of Newton brought forward physical arguments, of which however the conclusiveness is not immediately visible, the Copernican hypothesis was embraced on the grounds of its symmetry and simplicity rather than on demonstration. Opponents might always ask for the *experimentum crucis*, the effects of the earth's motion in the apparent displacement of the fixed stars, and this could not be supplied.

Many attempts were however made. At length Bradley commenced the research with far better astronomical means, and by his discoveries of aberration and nutation, fully explained the phenomena which had perplexed his predecessors. It is curious that Roemer, who had discovered the gradual transmission and finite velocity of light, should have been perplexed with the necessary results of this very property in another shape;

and that Bradley, while pursuing the problem of parallax, which had been originally interesting as a proof of the earth's change of place, should have hit upon phenomena which satisfactorily proved the earth's motion, and so confirmed the Copernican hypothesis by evidence different from what he sought. Bradley's observations further showed that the effect of parallax in any of the stars observed by him could not amount to 2″ and probably was not 1″.

Since Roemer and Bradley, many astronomers have sought for parallax by observation in right ascension and declination. Bessel could find no evidence of such an effect in Bradley's transit or zenith distance observations. Piazzi, from meridian zenith observations, concluded that Sirius had a parallax of 4″ and Procyon one of 5.7″. Calandrelli found a parallax of 4.4″ in α Lyræ. But the most persevering and accurate observations for deducing the value of parallax from meridian observations were, not long since, prosecuted by Dr. Brinkley at Dublin with an 8-foot circle by Ramsden, and by Mr. Pond at Greenwich with the 6-foot mural-circle of Troughton. Dr. Brinkley conceived that he had established without doubt a sensible parallax in α Lyræ, α Cygni, and α Aquilæ, while Mr. Pond maintained that no sensible parallax was shown in any of those stars, from observations in declination and in right ascension. He further corroborated this result by comparing two stars, α Cygni and β Aurigæ, which have nearly the same declination and opposite right ascension, with a fixed tube. This controversy continued for several years, and though there can be no doubt now that Dr. Brinkley was mistaken, and that Mr. Pond was right in his conclusions, there is a good deal of interest attached to the discussion.

Sir William Herschel first pointed out the mode of detecting parallax which affords a probability of success, viz. that which depends upon the measurement of double stars. He showed that if the stars which compose a double star be at different distances from the earth, which was at that time supposed to be the chief cause of differences in magnitude, they must be differently affected by parallax, and therefore that their apparent distance from each other will be altered by a change of position in the spectator. Now as the apparent distance of two neighbouring stars can be measured with great accuracy, the problem of parallax is thus reduced to that of finding a double star in which a variation of distance is observable, and following the law which the earth's change of place requires.

For his researches on parallax Bessel selected the double star 61 Cygni, which is a double star having a large proper motion. This property leads us naturally to guess that it is a comparatively near star, as its actual velocity would otherwise be enormously large. Two stars *a* and *b* were chosen, *b* in the direction joining the component stars of 61 Cygni, and *a* at right angles to this direction. The observations of *b* are made by bringing it into the middle of the two stars, those of *a* by placing it in the same line with the two stars. As the two stars of 61 Cygni are nearly of the same brightness, the observation is exceedingly accurate. These measurements were continued for fourteen months with very little interruption. The stars *a* and *b* are so far removed from 61 Cygni as to render any connection highly improbable. Variations were found in these distances, which, being compared with the effect which parallax would produce, are exactly accounted for; therefore this variation is produced by parallax, for it can be shown that any other known cause of disturbance has been got rid of by the skill of the observer. The result is that the parallax of 61 Cygni is 0.314″; whence the distance of 61 Cygni is 658,000 times the distance of the earth from the sun, and light from the star is 10¼ years in reaching us. Though subsequent observations may modify this result, there is no probability that it will undergo any considerable alteration. For Struve's inquiry into the subject of parallax, see his splendid work *Stellarum Duplicium et Multiplicium Mensuræ Micrometricæ, &c., annis à* 1824 *ad* 1837 *institutæ*, p. clxii., where he enters very fully into this subject.

PARALLELOGRAM (παραλληλό·γραμμα, parallel-drawn figure) is the mathematical term for a four-sided figure of which the opposite sides are parallel.

PARALLELEPIPED (παραλληλ·επίπεδον, parallel-plane solid), often incorrectly written parallelopiped, is the name given to a solid contained by six parallelograms, which are equal and parallel, two and two. It is in fact a quadrangular prism.

When all the parallelograms are rectangles, we have one of the figures to which our eyes are most accustomed, as in the case of a die, a box, a plank, a room, &c., &c. Persons not acquainted with mathematics would hardly believe that English mathematicians seldom express this most simple and elementary of all solids in less than ten syllables, as follows: — 'rect-an-gul-ar par-all-el-o-piped.'

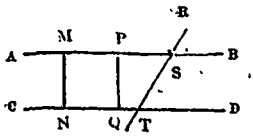
A more simple term might easily be obtained, and one perfectly consistent with analogy, namely, *right solid*. Thus a right line might be conceived as generated by the most simple motion of a point; a right surface (or rectangle) by the most simple motion of a right line; and a right solid (or rectangular parallelepiped) by the most simple motion of a right surface.

When the adjacent rectangles of a right solid are squares, the solid is a Cube, for which fortunately there is a shorter term than 'equilateral rectangular parallelopiped.'

The number of cubic units in a parallelepiped is found by multiplying the number of square units in either base by the number of linear units in the perpendicular distance between that base and the opposite one.

PARALLELS (παράλληλα, by the side of each other), the name given by the Greek geometers to lines in the same plane having that relation of situation of which it is one of the most obvious properties that such lines never meet, however far they may be produced or lengthened.

If we examine the properties of lines experimentally, it will be easy to satisfy ourselves of the existence of such pairs as A B, C D, which



neither diverge nor converge, and to which common perpendiculars, such as M N and P Q, all of the same length, can be drawn through any point of either. Moreover the angles R S B and R T D, made by the same line with both, will be found to be the same. If then we take the notion of permanence of direction, which always accompanies that of straightness, and also the notion of differing directions, which is suggested by two lines which make an angle, we may readily see that the relation of situation, which, adopting Euclid's term, may be called parallelism, is really that which would be also conveyed by the words sameness of direction; so that if two lines A and B be parallel, A may be substituted for B or B for A, in any proposition which involves relations of direction only, without affecting the truth of that proposition, if true, or its falsehood, if false.

Geometry, as every beginner knows, depends upon a small number of self-evident truths, or rather of propositions the truth of which (with one exception) is so soon and so easily perceived, that no one doubts of them when stated with ordinary attention to clearness of expression. The exception alluded to appears for the first time in Euclid, and has been the occasion of a controversy which has lasted from his time to the present.

It will be remarked that the definition of parallel lines is purely negative; it describes what they are not, not what they are: if lines which meet be called intersectors, parallels are *non*-intersectors. Those who would found geometry upon definitions entirely, may think that the difficulty of the theory of parallels arises from insufficient definition: but those who believe it to be deducible from real and positive conceptions, having nothing arbitrary about them, must suspect that, in this purely negative definition of parallels, we have not sufficiently described that very obvious relation of position which distinguishes parallelism from convergence, however short the lines we image to ourselves, or however little we think of what will take place if they are produced. Euclid, proceeding upon axioms the admission of which is not considered to be a question connected with the present difficulty, establishes the following proposition:—If the two lines S B and T D make the angles P S T and S T D equal, or R S B and S T D equal, or B S T and S T D together equal to two right angles (all which amount to the same thing), then S B and T D are non-intersectors. But before any further step can be made, it must either be proved or assumed that in every other case they are intersectors, and Euclid, being unable to prove it, assumes it directly. That is to say, he requires it to be granted that if B S T and S T D be together less than two right angles, S B and T D will meet, if produced, and on that side on which they make with S T the angles less than two right angles. The last clause is not a necessary part of the axiom, since it can be shown, independently of the present theory, that two lines which meet must make angles together less than two right angles with any line which cuts them internally.

Euclid obviously puts the whole difficulty into an assumption; which, though the most direct course, is not that which is best calculated to give the highest degree of evidence to geometrical truths. For it is a more obvious proposition that two lines which intersect one another cannot *both* be parallel to a third line, and this being granted, Euclid's axiom readily follows. If it should be objected that this is merely Euclid's axiom in another form, it is replied that the form is a more easy one, and therefore preferable; just as it would be wiser to assume 'Every A is B and every B is A,' than the identical but more complicated proposition 'Every A is B, and everything which is not A is not B.'

It is known then that the difficulty is entirely removed if we grant that 'two lines which intersect are not both parallel to any third line,' or, which is the same thing, that 'through a given point not more than one line can be drawn parallel to a given line.' The theory of Euclid is thus improved as far as it is capable of being done by a mere difference of statement.

PARA'LYSIS (a Greek word, παράλυσις, which signifies literally a 'loosening' or 'relaxation') is the diseased condition in which the natural power of sensation or motion is lost in any part of the body.

In the article NERVE the distinction was pointed out between the nerves of sensation and of motion, and it was stated that though most of the nerves distributed through the various parts of the body contain filaments of both kinds within the same sheath, yet the two orders of filaments are distinct in their origins and arise from separate portions or tracts of the brain and spinal chord. From this circumstance the differences between the principal varieties of paralysis arise. If a sensitive nerve, or the tract of nervous matter from which the sensitive nerves of any part arise, be destroyed or seriously diseased, there will be a loss of sensation in that part, but its natural power of motion will remain; if the same injury befal a motor nerve, or a centre of origin for motor nerves, the part supplied therefrom will lose its motion, but retain its sensibility; and if a mixed nerve, or both nervous centres simultaneously, be affected, there will be a loss at once of sensation and of motion. Hence we have two distinct kinds of paralysis—loss of sensation, which is sometimes called *Anæsthesia*, and loss of motion, to which the term Paralysis, or Palsy, is by some exclusively applied.

Each of these varieties of paralysis may vary in its degree of severity, or in the extent of the part of the body which it affects. For example, either kind may be *complete* or *incomplete*. In the former, the sensation or loss of motion, or both, are completely destroyed; in the latter, they are only impaired. In its varieties of extent, paralysis of

sensation may affect either a single nerve, as in loss of sight when dependent on disease of the optic nerve; in loss of smell, from affection of the olfactory nerve; in deafness, from disease of the auditory nerve; and loss of taste, from disease of the nerves appropriated to that function: or it may affect the sensitive nerves of a limb or of a variable portion of the body. In like manner paralysis of motion may affect a single muscle, as in *ptosis*, or dropping of the eyelid, from disease of the third nerve; or it may occur in a part of the muscles of the face, or the muscles of one or more limbs, or of a part of the trunk and limbs. Lastly, whole regions of the body may be paralysed; and of these cases the chief varieties are, *hemiplegia*, in which one side—half of the body—is deprived of sensation or motion, or of both; *paraplegia*, in which the lower part of the body is paralysed, while the upper retains both sensation and motion; and general paralysis, in which the loss of nervous power extends over nearly every part of the body.

Other varieties of paralysis are described from peculiar circumstances in their cause or symptoms; as Lead Palsy, which is produced by the influence of lead, either locally applied, as to the hands of painters, or received into the system generally; Creeping Palsy, which, commencing in a limited part of the body, gradually extends over a large portion of it; Shaking Palsy, in which the loss of motion being incomplete, any attempt at its exercise is effected by a trembling unsteady action, like that of a fatigued muscle.

The treatment of the various kinds of paralysis must depend on the nature of the lesion which produces them, and is consequently very varied.

PARAMATTA. [Wales, New South.]

PARAMO'RPHIA, or THEBAIA, a vegetable alkali obtained from opium. It is white; its taste is rather acrid than bitter; it is scarcely soluble in water, but is readily dissolved by alcohol and æther, and most so when hot.

PARANA'. [Brazil.]

PARAPET (from the Italian *parapetto*), a low or breast-high wall or fence, to serve as a protection on bridges, terraces, platform-roofs, &c. In Italian architecture parapets are generally balustrades. In gothic architecture the parapet is merely a continuation of the wall carried up above the edge of the roof, and finished by a coping; unless machicolated, in which case it projects and overhangs the walls below. In the Lombardic buildings of Italy there is seldom any parapet, the eaves of the roof finishing the elevation. The same is frequently the case in the Norman style. In Elizabethan buildings open-work parapets, forming various fantastical devices, are common.

PARAPET, in Fortification, is generally an embankment of earth which is formed either on the natural ground or on the upper surface of the rampart of a fortress or outwork. Parapets of brick or stone are sometimes constructed for works which are masked by others in their front, or on heights, or on the sea-coasts; but in other circumstances they would be improper, because the splinters detached from such materials by the enemy's shot are dangerous to the defenders, whereas the shot sinks into earth without doing further mischief.

The height of a parapet above the ground, or above the terreplein of a rampart which it surmounts, is about 7½ feet, in order that it may effectually cover the defenders behind it. In its mass are cut the embrasures through which the guns are fired; and a banquette, or step, about three feet high and four feet broad is formed, usually of earth, at its foot, on the interior side, in order to enable men, by standing on it, to fire over the upper surface.

PARAPHERNA'LIA. This term comprehends the dress and ornaments of a wife which she occasionally wears, and which she is entitled, under some limitations, to retain after her husband's decease. It cannot be accurately stated how much a wife may claim as her paraphernalia; for this will depend on the rank and fortune of the husband and wife. The term and the theory are borrowed from the Roman law. (See *Dig.* xxiii. 3, 9, and Roper, *Law of Husband and Wife*, 'Paraphernalia.')

PARAPHRASE (from the Greek παράφρασις). A paraphrase partakes of the nature both of a version, if the work paraphrased be in a foreign language, and of a commentary. Its object is to express the full sense contained in the words which are paraphrased, by the introduction of circumlocutions, explanatory clauses, and expansions of the author's meaning. A paraphrase, if well and honestly executed, is an excellent mode of giving a connected interpretation of a whole work.

PARASANG (παρασάγγης), a Persian measure of length, which, according to Herodotus, was equal to 30 stadia; and if we reckon 8 stadia as equal to one English mile, the parasang was consequently equal to nearly four English miles. Pliny however informs us that the length of the parasang was reckoned differently by different authors; and Strabo states that some reckoned it at 60 stadia, others at 40, and others at 30. The Arabic geographers reckon it equal to 3 miles.

PARASELE'NÆ (from παρὰ, near, and σελήνη, the moon). This name is given to the ill-defined and faintly luminous disks which occasionally appear in halos surrounding the moon, as the corresponding but brighter spots which are seen in halos about the sun are called parhelia. [Halo.] The phenomena of parhelia and paraselenæ are ascribed to a like cause; that is, a blending of the rays of light reflected from the parallel sides of small triangular plates of ice with those which are refracted through the sides containing one of the angles.

Sir Edward Parry, during his voyage to Melville Island, saw several lunar halos with paraselenæ.

PARASITES, or PARASITICAL PLANTS, are those plants which grow upon the living parts of other plants, from whose juices they derive their nutriment, a circumstance by which they are immediately distinguished from False Parasites, or Epiphytes, which merely fix themselves upon other plants without deriving food from them.

Parasitical Plants, properly so called, are extremely numerous, and belong to various parts of the vegetable kingdom. Some attack their victims

externally, others are insidiously introduced into the interior, where they flourish until they pierce through the skin, place themselves in communication with the open air, and disseminate themselves; hence, physiologists divide them into *intestinal* and *superficial*. The former are exclusively fungi, and appear under the forms to which the popular names of mildew, rust, brand, smut, &c., are applied; it is among the latter that parasites of so many different kinds are met with. These are again divisible into such as have true leaves, green, and capable of acting, in the manner of ordinary leaves, as organs of respiration and digestion; and such as have scales, brown or some colour not green, in the room of true leaves, without any powers of digestion or assimilation, except in a low degree. The first, or *leafy* or *green parasites*, elaborate their food for themselves; the second, or *scaly* or *brown parasites*, obtain it in a state of elaboration from other species.

Green Leafy Parasites belong exclusively, as far as is yet known, to the genera *Viscum* and *Loranthus*. The viscid seeds of these plants strike root upon any solid body on which they fall. If it is not suited to support them, as in the case of stones, rocks, or any inorganic substance, the root soon perishes; but if it is capable of yielding them nutrition, as the leaf or branch of a tree, the young root immediately forms a kind of convex disk, which adheres firmly to the surface, and by degrees introduces itself into the interior, so as to place itself in communication with the fluid contents of the plant on which it has germinated.

Brown Scaly Parasites always attack the roots of plants, and their underground habits have caused them to be little examined. The most common species in Europe are various kinds of *Orobanche*, which attack hemp, clover, lucern, and many other crops; *Monotropa* and *Lathræa*, which infest the roots, the first of the fir, and the second of the ash. In other countries Rhizanths abound, and probably many others of which we have no sufficient knowledge. To these are usually added *Neottia Nidus Avis* and *Corallorhiza innata*, two orchidaceous plants, concerning whose real habits we have however no precise information.

PARCÆ (called by the Greeks Μοῖραι), the Fates, were goddesses who were supposed to preside over the destinies of man. In Homer we only read of one deity, Μοῖρα or Αἶσα, whose decrees even the gods cannot escape; but in Hesiod and all succeeding poets we read of three Fates: Clotho (Κλωθώ), the 'Spinster;' Láchesis (Λάχεσις), the 'Distributor;' and Atropos (Ἄτροπος), the 'Unchangeable.' The Fates are represented as spinning the destinies of men. Clotho presided over the beginning, Lachesis the intermediate portion, and Atropos the end of life.

PARCENERS, or COPARCENERS, are so called because the lands of which they are parceners may be partitioned or divided among them. There may be parceners by common law and parceners by custom.

As to parceners by common law, if a man dies intestate seised of lands in fee, and leaves only daughters, the lands will descend equally to all the daughters, or if he has no daughters and no brothers, the lands will descend equally to all his sisters, if he has any; and if there are no nearer heirs, the lands will descend to his aunts. The descent is the same if a man dies seised of lands in tail, except where the estate tail was limited to such man and the heirs of his body, for in that case the lands can only descend to those who are heirs of the body. In all cases where several females take one inheritance by descent, they are called parceners; and all lands or tenements, including a rent charge, may descend in this manner. If there be a title of dignity descendible to heirs of the body, the lands and tenements belonging to it may descend to parceners; but the dignity itself does not descend, for all the parceners only make one heir, and a title of dignity is not in its nature divisible. The dignity therefore will be in abeyance.

The descent of the crown is an exception to this rule; for if there are several daughters, &c., and no male heir, the crown with all its rights descends to the eldest female.

Parceners may voluntarily make partition of their lands; and any one may compel a division by a suit in equity (3 & 4 Wm. IV., c. 27). The chief rules as to coparcenery are stated in Comyn's *Digest*, 'Parcener,' and in Littleton, b. iii., 'Of Parceners.' See also 3 & 4 Wm. IV., c. 27, s. 12.

PARCHMENT is the skin of the sheep, lamb, goat, pig, or calf, prepared for writing upon. When the skin is divested of its hair or wool, it is placed for some time in a lime-pit, and then stretched on a square wooden frame drawn tight by pegs. When in the frame, it is first scraped on the flesh side with a blunt iron, then wetted with a moist rag, covered with pounded chalk, and rubbed well with pumice-stone. After a short pause these operations are repeated, but without chalk. The skin is then turned, and scraped on the hair side once only. The flesh side is scraped once more, and again rubbed over with chalk. All this is done by the skinner, who allows the skin to dry in the frame, and then cuts it out and sends it to the parchment-maker, who repeats the operations with a sharper tool, using a sack stuffed with flocks to lay the skin upon instead of stretching it in a frame.

PARDON. According to the law of most countries, a power of pardoning, or remitting the penal consequences of a conviction for crimes, is vested in some person. The utility of such a power has been doubted, upon the ground that it supposes an imperfect system of criminal law, and that every instance of its exercise is the proclamation of an error either in the law itself or in the administration of justice. (Beccaria, *chap.* 46.) There is no doubt that the *nearer a penal* system approaches to perfection, the *fewer* will be the occasions for resorting to extraordinary remissions of the execution of the law; but considering the numerous causes of erroneous decision, arising not only from the imperfection of laws themselves, but from the infinite sources of error in the instruments and means by which they are

administered, it seems to be desirable that some power should exist which may correct error in cases where it cannot be corrected by any appellate tribunal. At the same time it is evident that such a power should be circumscribed and defined, as far as its nature will admit, and exercised with the utmost caution. By the law of England, besides pardons by act of parliament, the power of granting pardons for crimes is exclusively vested in the king as a branch of his prerogative.

The power of pardoning is applicable in all cases in which the crown is either concerned in interest or prosecutes for the public. The only exception to this rule is contained in the Habeas Corpus Act (31 Car. II., c. 2, s. 12), by which persons convicted of signing commitments of British subjects to foreign prisons are declared to incur the penalties of a *præmunire* and to be 'incapable of any pardon from the crown.'

The crown has however no power to pardon any offence in the prosecution of which a subject has a legal interest, a doctrine laid down by Bracton (lib. iii., p. 132). Thus in indictments for common nuisances, where the public are interested as individuals or particular classes, or informations upon penal statutes, where the penalty or any part of it goes to the informer, or the party grieved, the crown cannot pardon the offender. By the Act of Settlement, 12 & 13 William III., c. 2, it was enacted 'that no pardon under the great seal of England shall be *pleadable* to an impeachment by the Commons in Parliament.' This statute does not affect the power of the crown to pardon the offender after he has been found guilty upon the impeachment, and the proceedings are determined.

A pardon may be either absolute or subject to any condition which the crown may think proper to annex to it. Until the recent improvements in the criminal law of England, almost all felonies were nominally capital; and in the numerous cases where it was not intended that the sentence of death should be executed, the criminal obtained a pardon upon condition of his submitting to transportation or some other punishment. At present, where the crown interferes to mitigate or commute a sentence, the mode by which it is effected is by granting a conditional pardon.

The effect of a pardon is not merely to prevent the infliction of the punishment to which the offender is subject, but to restore his legal capacity.

PARÉ, AMBROSE, the first and most eminent of the old French surgeons, was born in 1509, at Laval, in the province of Maine and the modern department of Mayenne. His parents were poor, and his education was neglected, but, having one day witnessed the operation of lithotomy, he went immediately to Paris and commenced the study of surgery. He afterwards accompanied the French army during several campaigns in Italy, and gained so much reputation, that in 1552 he was appointed surgeon in ordinary to King Henry II. He held the same office under Francis II., Charles IX., and Henry III., until his death at the age of 81, in 1590. He appears to have been a pious and excellent man, and having been educated in the reformed church, he steadily refused to leave it. During the horrible massacre of St. Bartholomew's, he owed his life to his professional reputation and the personal friendship of the king, whom, as he tells us himself, he had especially obliged by having saved from the consequences of a wound accidentally inflicted on the median nerve in venesection. The French writers justly consider Paré to be the father of modern surgery, and say that he holds the same rank in this branch of the profession as Hippocrates does in medicine. He was not satisfied with blindly following the precepts of his predecessors, but by diligent observation and reflection made several important changes in the mode of treatment, which have been followed to the present day.

PAREIRA, a Portuguese name given in Brazil to the roots of certain plants employed in medical practice as valuable tonics and diuretics. The sort which is admitted into the Pharmacopœias of Great Britain is called *Pareira brava*.

PARELLA, the name of a lichen, the *Lecanora Parella* of botanists, but which is applied to several species similar to it in habit, and employed for the same purpose, that is, for yielding a dye known by the name of *Litmus*. The mode of preparing this is not well known, but it is probable that it is similar to that employed in the manufacture of Orchil. It was brought into extensive employment by Dr. Cuthbert Gordon, who took out a patent for his process, converted his Christian name into *Cudbear*, and applied it to the dye-stuff employed to produce purple for dyeing woollen yarn.

PARENCHY'MA is the term which was applied by the old anatomists to an imaginary substance, through which they supposed the blood at the ends of the veins to be strained. In the present day this term is rarely used in animal anatomy. It is however used by botanists to signify a certain part of vegetable tissue.

PARENT AND CHILD. This relation arises only from a legal marriage. [BASTARD.]

Parents are bound to maintain their legitimate children who are unable to maintain themselves owing to infancy or inability to work. This obligation extends to father and mother, grandfather and grandmother, if they are able to perform it. (43 Eliz. c. 2.) But such persons are only bound to furnish the children with the necessaries of life; and the penalty incurred in case of refusal is 20*s.* per month. A husband is (4 & 5 W. IV. c. 76) liable to maintain the children of his wife, born before marriage, whether they are legitimate or not, until they are of the age of 16, or until the death of his wife. If a parent deserts his children, the churchwardens and overseers may seize his goods and chattels and receive his rents, to the amount mentioned in the justices' warrant, which must be obtained before such seizure is made.

Parents are not bound to make any provision for their children after their death. But a freeman of London is under some limitations as to the power of disposing of his personalty by will, which limitations are in favour of his wife and children. A parent and child may aid each other in a law-suit by paying fees, without being guilty

of maintenance, if they have no expectation of repayment.

Parents are not legally bound to give any education to their children, nor are they under any restrictions as to the kind of education which they may give.

The power of a father over his children continues until the age of 21. If a parent die, leaving a child under age, he may appoint a guardian to such child till the age of 21, by a will executed pursuant to 1 Vict. c. 26. A person under age, except a widower or widow, cannot marry without the father's consent, or such consent as is required by the Marriage Act.

A child under age may acquire property by gift; and if a father is the trustee of his child's estate, he must account to the child when he comes of age, like any other trustee. So long as a child who is under age lives with and is supported by the father, the father is entitled to receive the reward of the child's labour. When a child has a fortune of his own, and the father is not able to maintain him suitably to such fortune, a court of equity will allow the father a competent sum for maintenance out of the child's estate.

A parent may maintain an action for the seduction of a daughter on the ground of loss of her services, if there is evidence of her acting in the capacity of servant, or living with the parent in such a manner that the parent had a right to her services.

A father is entitled to the care and custody of his children, but he may be deprived of the care of them by the Court of Chancery, if his conduct is such as, in the opinion of the court, endangers the morals of the children.

Under the act 2 & 3 Vict. c. 54, a mother who is living apart from her husband may obtain by petition an order from a court of equity for access to her child which is in the sole custody of the father, or of any person by his authority, or of any guardian after the death of the father, subject to such regulations as the judge may think convenient and just; and if such child shall be within the age of seven years, the judge may order the child to be delivered into the custody of the mother until the child attains the age of seven years, subject to such regulations as aforesaid. But no mother is to have the benefit of the act against whom adultery has been established by judgment in an action at law, or by the sentence of an ecclesiastical court.

A child who is under the parental power owes obedience to his parent, which the parent may enforce by his superior strength, provided he uses it with moderation. He may beat his child and restrain his liberty, but not in such a way as to injure his health. A child is legally bound to maintain his indigent father and grandfather, mother and grandmother, if he is able; the penalty in case of refusal is 20*s.* per month.

PARGA, a town in the Turkish province of Albania, situated on the coast of the Ionian Sea, opposite to the Isle of Paxo, from which it is 12 miles distant, in 39° 17′ N. lat., 20° 18′ E. long., stands on a rock that forms a small peninsula, lashed on three sides by the sea. It has two ports, one of them anciently called γλυκὺς λίμην 'the port of sweet waters,' now *Port Veliki*. The town is walled, and has narrow streets. The citadel, on the summit of the rock, is almost impregnable. The country around is fertile, and the townsmen export oil, tobacco, fruit, and wine. On the downfall of the Eastern Empire, Parga sought the protection of Venice, under which city it enjoyed its municipal freedom till 1797, when with the other Venetian possessions on the coast of Epirus, the town came into the hands of the French. On the invasion of Egypt by the French in 1798, a coalition was formed between Russia and Turkey, the French were driven from their possessions in the Ionian Sea; and the towns they held on the coast of Albania were, according to a treaty between Russia and the Porte, signed in March, 1800, henceforth to belong to Turkey. Parga, accordingly being one of these towns, was summoned by Ali Pasha to submit, but its inhabitants boldly refused. Deprived of French protection, they sent a deputy to Constantinople to request the interference of the Porte, and through the interest of Russia a Turkish bey was sent to protect them from the encroachments of Ali. This continued till 1806, when war breaking out between Russia and the Porte, Ali renewed his designs upon Parga, which applied to Russia, and received a Russian garrison. By the treaty of Tilsit in 1807, the French regained the Ionian Islands, and sent a garrison to Parga, of which Ali had demanded the formal cession and been refused. The English having, in 1814, taken the Ionian Islands from the French, Ali sent a strong force against Parga, which was defeated by the townsmen unaided by the French garrison, which still remained in the town. The Parguinotes, seeing that they could no longer rely on the protection of France, offered to hoist the English flag, and master the French garrison, if the English would take them under their protection. This offer was agreed to, and an English force took possession of the fortress, March 22, 1814, and the French garrison was sent to Corfu. The Porte, being invited to accede to the stipulations of the convention of Paris, dated Nov. 5, 1815, (by which the Ionian Islands, with their dependencies, were to form an independent state under the protection of Great Britain,) demanded, as a preliminary step, the fulfilment of the treaty of March, 1800, by the formal cession of Parga. After some lapse of time, an agreement was entered into at Constantinople between the English minister and the divan early in 1817, for the delivery of Parga to the Porte, under the condition that those inhabitants who might choose to emigrate should have an asylum in the Ionian Islands, and their immovable property be valued and paid for by the Porte previous to their embarkation. This arrangement was formally announced to the Parguinotes, May 28, 1817, and they declared for leaving the place rather than trusting themselves to the Turks. At last, in May, 1819, the whole population of Parga, amounting to 800 families, making between 3000 and 4000 individuals in all, embarked in English vessels, having received the valued amount of their property,

150,000*l.*, and were settled at Paxo and Corfu. The Turks then occupied Parga.

PARHE'LION (παρὰ, by the side of, ἥλιος, the sun), a name given to the mock suns, as they have been called, which sometimes appear near the sun; being, as is supposed, images of the sun formed by reflection from a cloud.

PARIA, THE GULF OF, extends between the island of Trinidad and the republic of Venezuela in South America, for about 100 miles, from 61° 30′ to 63° W. long. It has nearly the form of a quadrangle, and is about 30 miles across. A hilly promontory, projecting from the main land more than seventy miles, separates the gulf from the Caribbean Sea, and terminates on the east with cape Punta de la Peña, which is also called Cape Paria. Opposite this cape, and about 20 miles from it, is the most north-western point of the island of Trinidad. This opening contains four straits formed by three rocky islands. As the current runs northward through all these straits, the gulf can only be entered with a strong breeze. The southern entry of the gulf is between the rocky cape called Punta Icacos, in the island of Trinidad, and the low alluvial shores lying on both sides of the two most western of the mouths of the Orinoco. From these low shores a shoal extends across the strait to within about half a mile from Trinidad. The part of this shoal nearest to Trinidad is dry at low water, and between it and Trinidad is the narrow entry into the gulf.

The gulf itself is one of the most extensive and best natural harbours on the globe. It offers nearly everywhere excellent anchorage. Its depth, except near the shores, varies between 8 and 30 fathoms, and the ground is everywhere free of rocks. It is only along the south-western coast that there are sandy shoals, and these have from 3 to 5 fathoms water on them. The water is as salt as that of the Atlantic, though it receives a great volume of fresh water by those mouths of the the Orinoco which fall into it. It is supposed that the current through the gulf is caused by the waters of the Orinoco. The tides also, which rise about six feet, run with great force.

PARIAN CHRONICLE is the name given to a block of marble preserved at Oxford, which contained in its perfect state a chronological account of the principal events in Greek history during a period of 1318 years, beginning with Cecrops, B.C. 1582, and ending with the archonship of Diognétus, at Athens, B.C. 264. The chronicle of the last 90 years was however lost, so that the part which now remains ends at the archonship of Diotímus, B.C. 354. This chronicle was purchased at Smyrna, together with several other relics of antiquity, by Mr. William Petty, who was employed by the Earl of Arundel, in the year 1624, for the purpose of making collections for him of ancient works of art in Greece, Asia Minor, and the islands of the Archipelago. The Chronicle reached London in 1627, and was examined, at the suggestion of Sir Robert Cotton, with great care by the learned Selden, in conjunction with Patrick Young, librarian to James I. and Charles I., and Richard James, Fellow of Corpus Christi College, Oxford. 'Many of the characters,' says Selden, 'were entirely obliterated, and many nearly so; nevertheless, by the assistance of glasses, and the critical sagacity of my very kind friend Patrick Young, after a great many repeated trials, I have restored them as well as I could.' The Chronicle was published by Selden, together with other inscriptions which were brought to England by Mr. Petty in the following year (1628), under the title of 'Marmora Arundelliana.'

During the civil war in the reign of Charles I., the Earl of Arundel removed to Antwerp, and many of the marbles, which were deposited in the gardens of Arundel House, were defaced and broken, or used to repair the house. The latter was the fate of the Parian Chronicle; the upper part of it, containing at least half the inscription, is said to have been worked up in repairing a chimney at Arundel House; but fortunately a copy of it was preserved in Selden's work.

In 1667 Henry Howard, grandson of the Earl of Arundel who obtained the chronicle from Greece, presented it to the university of Oxford, where it is preserved, together with other antiquities collected by the Earl of Arundel, in a room adjoining to the Public Schools, called the Musæum Arundelianum. The Chronicle was published again in Prideaux's 'Marmora Oxoniensia,' folio, 1676, which was reprinted in 1732, under the care of Michael Maittaire, and again in 1791, Oxford, under the care of W. Roberts. In Chandler's 'Marmora Oxoniensia,' which was published in 1763, great pains were bestowed upon the Parian Chronicle, and many parts in which the inscription was defaced were supplied by conjecture. It has also been published, with an English translation, in the works of Robertson, Hewlett, and Hales.

The authenticity of this Chronicle was never called in question till the latter end of the last century, in which a work was published by the Rev. J. Robertson under the title of 'The Parian Chronicle, or the Chronicle of the Arundelian Marbles, with a Dissertation concerning its Authenticity,' London, 1788, in which it is maintained to be a modern fabrication. The arguments of Robertson have been answered by Hewlett, Gough, Porson in the 'Monthly Review,' 1789, by Hales in his 'Chronology,' and by Boeckh in the second volume of his 'Corpus Inscriptionum.'

PARIETA'RIA, a genus of plants belonging to the natural order *Urticaceæ*. *P. officinalis*, Wall Pellitory, is a British plant, and is found on old walls and rubbish. It is the *P. erecta* of Koch and Reichenbach.

PARIME MOUNTAINS are an extensive system of mountains in South America, which spread over the surface of Guyana, and also over portions of Venezuela and Brazil. In length they extend nearly 1200 miles, between 51° and 68° 30′ W. long. Their width varies between 140 and 450 miles, between the parallels of 1° and 8° N. lat.

PARING AND BURNING, an operation in agriculture, which consists in cutting a thin slice from the surface of land which is overgrown with grass, heath, fern, or any other plants which form

a sward by the matting together of their roots. The sods are allowed to dry in the sun to a certain degree, after which they are arranged in heaps, and burnt slowly, without flame or violent heat. The result is a mixture of burnt earth, charred vegetable fibre, and the ashes of that part which is entirely consumed.

The object of this operation is twofold: first, to kill insects and destroy useless or noxious weeds completely; and secondly, to obtain a powerful manure, impregnated with alkaline salts and carbonaceous matter, which experience has shown to be a very powerful promoter of vegetation.

The instruments by which this is effected are, either a common plough with a very flat share, which may be used when the surface is very level without being encumbered with stones or large roots, as in low moist meadows, or in most other cases a paring-iron used by hand, the cross-bar of which is held with both hands; and the upper parts of the thighs, being protected by two small slips of board, push the instrument into the ground, so as to cut a slice of the required thickness, which is then turned over by moving the cross handle. The labour is severe, and a good workman can scarcely pare more than one-sixth of an acre in a day.

Paring and burning the surface is an almost invariable preliminary in the converting of waste lands to tillage; and where these lands are in a state of nature, overrun with wild plants which cannot be easily brought to decay by simply burying them in the ground, burning is the readiest and most effectual mode of destroying them. In this case the practice is universally recommended and approved of.

But it is not only in the reclaiming of waste lands, and bringing them into cultivation, that paring and burning the surface is practised. The fertility produced by the ashes, which is proved by the luxuriance of the vegetation in the first crop, has induced many to repeat this process so often as materially to exhaust the soil, and induce partial sterility. Hence, when used on land already in cultivation, it requires due attention to be paid to the nature of the soil and other circumstances.

If the earth which is burnt with the sods is of a cold clayey nature, the fire will change it into a kind of sand, or brick-dust, which is insoluble in water, and corrects the too great tenacity of clays, by converting them more or less into loams. This is so well known, that clay is often dug out of the subsoil to be partially burnt. On stiff clay soils therefore there is a double advantage in paring and burning, that of the vegetable ashes and of the burnt clay.

Burning clay soils is something analogous to liming. Lime dissolves the vegetable matter, and enables its elements to enter into new combinations; but if no new vegetable matter be added to restore what is exhausted by vegetation, liming, as well as paring and burning, is detrimental in the end. Many experienced farmers pare and burn the soil on the edges of their ditches and on the banks on which the hedges grow, because they thereby exterminate many rank weeds; and the burnt earth mixed with farmyard dung makes an admirable compost. The proper time to pare and burn is evidently after the land has lain in grass for several years, and is broken up for tillage. The surface should be pared thin; about two inches is the extreme thickness allowable for the sod if the soil is very stiff and poor, and as thin as possible in a better soil. It should be done with a breast-plough or paring-iron by manual labour. The sods should be moderately dried, and then arranged into small heaps with a hollow in the middle to hold heath or bushes to kindle the fire. When it has fairly established itself, all the apertures should be carefully closed. Wherever any smoke breaks out, a fresh sod should be immediately put over it; a heap containing a small cart-load of sods should be smouldering for several days without going out, even if it rains hard. If the fire is too brisk, the earth will form hard lumps and even vitrify; but otherwise it comes out in the form of a fine powder, in which evident marks of charcoal appear. If this is of a fine red colour, it is a good sign; for the iron in the earth has been converted into a peroxide which is perfectly innocent in its effects on vegetation, whereas all the saline impregnations of iron are more or less hurtful. It is better to burn the sods in large than in small heaps; for the more the fire is smothered, the better the ashes.

Old rough pastures may often be greatly improved by a very thin paring and burning, so as not to destroy all the roots of the grass. When the ashes are spread over the pared surface, some good grass-seeds are sown with them. The whole is well harrowed or scarified and rolled, and the grass which will spring up after this will be greatly improved, and will fully repay the expense of this simple mode of renovating it. This is the cheapest mode of improving coarse pastures, that we know, without breaking them up.

PARINI, GIUSEPPE, one of the best and most popular Italian poets of the 18th century, was born in the district of Bosisio near the lake of Pasiano, in the Milanese territory, May 22, 1729. His father, though poor, was anxious to bestow upon him a good education, and for that purpose removed to Milan. He published a volume of poetry, at the age of 23; which procured for him admission into the Accademia dei Transformati at Milan, and that of the Arcadians at Rome. It was in 1763 that he published the 'Mattino,' the first part of his celebrated poem 'Il Giorno;' which he had been induced to do by Count Firmian, then Austrian minister of Lombardy, who, after employing him some time in editing a gazette, appointed him professor of belles-lettres in the Palatine Schools at Milan, and, on the suppression of the Jesuits, promoted him to the professorship of eloquence at the college of the Brera. Leopold II. promoted him to the prefectureship of the Brera, with an increased salary. At the period of the French revolution General Bonaparte and Saliceti caused him to be elected one of the magistrates of Milan; but, being disappointed in his expectations of being able to

serve his fellow-citizens, he requested permission to retire from office, and bestowed on the poor the emoluments he had derived from it. From this period he lived in retirement, poor but respected. He died Aug. 15, 1799. Besides 'Il Giorno,' which is an ironical didactic poem, Parini wrote lyrical poems and various other poetical compositions.

PARIS, the metropolis of France, is situated on the river Seine, in 48° 50′ N. lat. and 2° 20′ E. long. It is in the department of Seine, of which it is the chief town.

Paris is mentioned by Cæsar under the name of Lutetia ('Bell. Gall.,' vi. 3; vii. 57, 58), and it was then the chief town of the Parisii, a tribe probably of the Belgic stock. In the division of the country made by the Romans, Lutetia was included in the province of Lugdunensis Quarta, or Senonia.

For the next four centuries the place is hardly noticed. About A.D. 358 or 360 it took the name of the tribe to which it belonged, Parisii. It was the seat of a bishopric, perhaps as early as the middle of the third century. In or about the year 494 it was taken by the Franks under Clovis, who fixed his residence there, and was buried there (A.D. 511). In the 9th century the Northmen or Normans attacked and pillaged the city several times. Under the Carlovingians, Paris was the capital of a county comprehended in the duchy of France. Hugues Capet inherited both the county and the duchy; and, upon his assumption of the crown (A.D. 987), they became part of the royal domains.

Hugues Capet, now king, continued to reside at Paris, which thus again became the capital of the kingdom of the Franks, and for nearly 900 years Paris has continued to be the capital of France. It has been progressing in extent, power, and population, almost uninterruptedly throughout that long period; and it has been more closely connected with the history and politics of France than even London in respect to those of England. It has been besieged several times; but has suffered more from civil wars than from foreign aggression. Paris was the chief scene of the revolutions of 1789, 1830, and 1848.

The limits of Paris are defined by the wall erected (for fiscal purposes) in the reign of Louis XVI.; the outline thus formed, through broken by many irregularities, approximates to an oval, having its longer diameter, from W.N.W. to E.S.E., about 5 miles, and its shorter diameter 3¼ miles. The included area is about 8500 acres, or 13¼ square miles. The number of barriers or entrances through this wall is about 50, most of which have toll-houses attached to them, where the octrois, or local duties on goods entering the capital, are levied. Round the wall of Paris, on the outer side, is a road, planted with fine rows of trees, forming what is termed the Boulevards Extérieurs. The circuit of the wall and of its accompanying boulevards is rather more than 15 miles. This circuit is skirted nearly on all sides by heights, so that the site of the city is a natural hollow. The population in 1846 was 935,261.

The present inclosure of the city walls comprehends several portions, which, as being exterior to the walls existing till the time of Louis XIV., were designated Faubourgs, or suburbs, and which still retain that name. Some villages, formerly distinct, but which had acquired, by the gradual extension of the city, the character of suburbs, are also comprehended within the present boundary, and give name to particular quarters. Of these faubourgs the chief are those of Chaillot, St. Honoré, du Roule, Chaussée d'Antin, Faubourg Montmartre, Poissonnière, St. Denis, St. Martin, du Temple, St. Antoine, on the north of the Seine; and St. Victor, St. Marcel, St. Jacques, St. Michel, St. Germain, and Gros Caillou, south of the Seine. The character of suburbs now more properly belongs to the villages and hamlets which surround Paris on the outside of the wall, such as Passy, Montmartre, La Villette, Belleville, Menilmontant, Charonne, Montrouge, Vaugirard, and Grenelle.

The Seine passes through Paris in its course from the south-east to the west side of the inclosure, dividing the city into two unequal parts, that on the north side of the river being by far the larger. In the river are three islands; there were originally five, but the two westernmost have been united to the adjacent island of La Cité. The island of La Cité and that of Nôtre Dame, now St. Louis, are occupied by buildings; the remaining, and easternmost island, that of Louvier, is occupied as a depôt for firewood. The banks of the river and of the islands of La Cité and St. Louis are (with one slight interruption) occupied by stone quays, furnished with parapets, and forming broad and continuous lines of street, with stone stairs at different parts. There are at different intervals wharfs or places for landing goods, termed by the French 'ports.' The river is crossed by numerous bridges, connecting the banks with each other, or with the islands, or the islands one with another. The Pont-Neuf, which crosses the two arms of the Seine with the intermediate island of La Cité, is the longest bridge, and is about as long as the Southwark Bridge at London. The other bridges across the Seine are scarcely half the length of the Pont-Neuf.

The central part of the town, which is by far the oldest, has narrow and crooked streets, skirted with tall gloomy-looking houses, chiefly built of stone. The outer parts of the town are more regularly laid out. The paving and lighting are far inferior to those of the London streets. The Boulevards (sometimes distinguished as the Boulevards Intérieurs) are a line of streets, forming a circuit of smaller extent than the city wall. They indicate, on the north of the river, the line of the ramparts and ditches demolished and filled up by Louis XIV.; on the south side they are of later date, and take a wider circuit than the ancient walls. They are planted throughout with alleys of trees, and the northern boulevards are the gayest thoroughfares in Paris. In 1846 there were about 2000 streets, lanes, &c., in Paris.

The largest of the Places, or squares, is that of Louis XV., or La Concorde. The other principal places are the Place Vendôme, the Place des Victoires and the Place du Trône (both circular), the Place du Carrousel, and the Place Royale.

These Places are not commonly occupied by gardens, like the squares of London; but some of them are adorned with columns, statues, fountains, or other decorations. There are several public gardens and walks, as the gardens of the Tuileries, the Luxembourg, and the Palais Royal; the Champs Elysées (Elysian Fields), the Avenue de Neuilly, and the numerous avenues in the neighbourhood of the Ecole Militaire, which are streets or roads lined with alleys of trees, like the boulevards. The Champ de Mars is a very large inclosure, attached to the Ecole Militaire, and used for reviews; the Esplanade des Invalides is a garden or pleasure-ground extending from the Hôtel des Invalides to the bank of the river. Some of the above names have been changed since the recent revolutionary struggle, 1848-9.

The buildings of Paris have greatly improved in architectural beauty within the present century. Napoleon enriched the capital with many fine structures, and Louis Philippe added to their number.

The cathedral of Nôtre Dame is 442 feet in length externally; in breadth 162; breadth of nave 42, length of nave to transept 186, transept 155, width of front 134, and height of towers 235 feet. The plan is divided into a nave and four aisles, besides a range of seven chapels on each side between the external buttresses; consequently the projection of the transept, or form of the cross, does not show itself at all in the lower part of the building. In magnitude, and in the richness of plan produced by the additional aisles and chapels, Nôtre Dame is superior to Westminster Abbey; but in the general effect of the interior the latter is the finest structure.

The church of St. Geneviève, or the *Pantheon*, and the Hôtel des Invalides, are two structures which have attracted notice chiefly on account of the domes with which they are surmounted. The interior of the Pantheon is 295 feet long, transept 262, and breadth 104.

The new church of the Madeleine is on the model of a Corinthian peripteral temple, upon a noble scale, and so far a very fine piece of classical architecture. The dimensions are 328 feet by 138, independently of the projection of the flights of steps at each end, which make the total length of the base or substructure 418 feet; the columns, 52 in number, are 62 feet high, and the entire height from the ground to the apex of the pediment, 116 feet. The interior measures 259 feet by 52, and consists of three compartments in length, covered by as many flat domes, through which the building is lighted, there being no side windows.

The Louvre is nearly a square, of 576 feet by 538, inclosing a court 394 feet square. The celebrated east front or colonnade is in a style of simple grandeur. The great gallery extends from the Louvre to the Tuileries, in a line of more than 1400 feet. The interior of the Louvre has undergone repeated changes and modifications, and among the later ones are the decorated rooms, eighteen in number, appropriated as a museum of Egyptian antiquities, and also the new museum of Spanish painters.

The Luxembourg Palace was erected by Mary de' Medici, and is a good specimen of its particular style (the Florentine). One of the most splendid features of the interior is the grand staircase. The hall is a semicircle about 80 feet in diameter, lighted from the roof, and decorated with Corinthian columns.

The Chamber of Deputies, formerly the Palais Bourbon, is remarkable for the modern façade towards the river and Place de la Concorde. The whole extent of this side of the building is 236 feet, 136 of which form an advancing central mass faced by a Corinthian portico of twelve columns, leading up to which is an ascent of steps, about 15 feet high, flanked by pedestals and statues.

The Hôtel des Monnaies, or Mint, near the Pont Neuf, is a noble structure of palatial aspect. It has two fronts of nearly the same extent, 376 feet.

Although without much architectural beauty, the Halle aux Blés, or Corn-Market, merits notice for its convenience and agreeable effect of plan. It is a rotunda whose external diameter is 225 feet, containing within a circular arcade of twenty-five arches, leaving a clear central space, 127 feet in diameter, covered in by a metal dome, with a skylight in the centre.

The Bourse is an insulated building standing in the centre of a large square or Place. The form is a parallelogram, measuring 164 feet by 234, and is entirely surrounded by a Corinthian peristyle of sixty-four columns. The interior contains several offices and other apartments, and a large central hall for the Exchange—108 feet by 59 (exclusive of the arcades or galleries by which it is surrounded on both floors), and lighted by a central skylight in the vaulted roof.

The public buildings of Paris are so numerous, that we can only mention the principal of those not described above, which are (in the order of their construction)—St. Germain, La Sainte Chapelle, St. Severin, Hôtel de Clugny, St. Mery, Fontaine des Innocens, Hôtel de Ville, Tuileries, Palais de Justice, Sorbonne, Observatory, Porte St. Denis, Porte St. Martin, Place des Victoires, Place Vendôme, École Militaire, Garde Meuble, Palais Royal (street front), Lycée Bourbon, Arc des Tuileries, Arc de l'Étoile, Hôtel des Affaires Étrangères, Halle aux Vins, École des Beaux Arts, numerous theatres, bridges, &c.

Paris is especially rich in triumphal columns and arches. The Colonne Vendôme is 132 feet high, and in general design is a copy of Trajan's Column. The shaft is entirely covered with bronze reliefs, the work of thirty different artists, who executed them under the direction of Denon; the pedestal is likewise highly enriched. The Colonne de Juillet, erected on the Place de la Bastille, is somewhat loftier than that of the Place Vendôme, but similar in character; the bronze bas-reliefs, forming the exterior of the shaft, consist of twenty cylindrical bands or rings, fitted one into another. The Luxor obelisk is noticed under Obelisk. The Arc de l'Étoile is, without exception, the most gigantic work of its kind either in ancient or modern times; nor can we perhaps give a better general idea of its

colossal dimensions than by stating that eight such structures as Temple Bar, London, would stand within the great arch, that is, four in depth and as many above them, the arch of the Etoile being 47 ft. 10 in. wide, 96 ft. 6 in. high, and 73 ft. in depth. This structure is perfectly insulated, and forms a mass whose plan is 147 feet by 73, and its height 162, the effect of which extraordinary dimensions is greatly enhanced by its simplicity of form and its solidity, the outline being unbroken by columns and projecting entablatures. It is ornamented by a profusion of fine sculptures.

The students of various classes form a considerable part of the population of Paris. The Académie Universitaire, or University of Paris, is attended by 7000 to 8000 students; and the other institutions for superior education are also attended by a great number of students, swelling the total number to nearly 18,000. There is also a considerable manufacturing population; for in the variety and extent of its productions of industry, Paris may vie with most cities of the world. The carpets of the manufactory of La Savonnerie and the tapestry of the Gobelins are well known. Cashmere, silk, and woollen shawls; light woollens, cotton goods, hosiery, gloves, hats, embroidery, lace, and other articles of fashionable attire; jewellery, gold and silver plate and trinkets, clocks and watches, bronzes, and musical, mathematical, and philosophical instruments; paper-hangings, household furniture, carriages, saddlery, leather, glue, cutlery, fire-arms, liqueurs, and confectionary, are made. Dyeing, printing, engraving, and lithography; the manufacture of salts, acids, oxides, and other chemicals; the refining of sugar, tallow-melting, the distillation of brandy from potatoes, brewing, and the manufacture of potato-starch, are carried on with considerable activity. The Seine furnishes the principal means of water-carriage: it is navigable for barges and other small craft. The canals of the Ourcq, St. Denis, and St. Martin, give to Paris water communication with many parts of the vicinity. The timber brought into Paris is immense. Wood is the principal fuel consumed at present, but the consumption of coal is gaining ground. The markets for the sale of provisions are numerous and generally well arranged.

A considerable part of the southern quarters of Paris stands on excavations from which the stone was procured for the building of the city. A part of these excavations is occupied by the catacombs, or depositories of the bones brought from the disused cemteries in the heart of Paris. Nearly all the present burial-places are without the inclosure of the city walls; that of Père La Chaise, on the north-east side of the city, is the principal.

The offices of the general government and the buildings connected with it are numerous. For the purposes of municipal government, Paris is divided into twelve parts, called 'arrondissemens,' which are subdivided each into four 'quartiers' (quarters). Each arrondissement has a separate mairie, or municipality, over which a maire (mayor) presides. There is also a justice of the peace to each of the twelve arrondissements; and a commissary of police to each of the forty-eight quarters. The council of the department over which the prefect presides forms a municipal council for Paris.

The monasteries and nunneries of Paris have been almost extinguished in recent times. Of colleges or public schools of a higher grade, the principal are those of Louis le Grand, of Henri IV., of St. Louis, of Bourbon, of Charlemagne, of Ste. Barbe, and of Stanislas. Of educational establishments of the highest class, or for special or professional instruction, the most important is the Académie Universitaire, or university. The College Royal de France, which may be regarded as equivalent to a university, though without the name, has nearly 1000 students; and the lectures on natural philosophy at the Jardin des Plantes are attended by 3000 persons. The Royal Conservatory of Arts and Trades is attended by about 1000 pupils. To these may be added the Polytechnic School, the schools of medicine, of astronomy (at the Observatory), of engineering, of mining, of music, of lyric and dramatic elocution, of the fine arts; and a number of others, especially the normal school for the instruction of teachers. The Museum of Natural History, and the Menagerie and Botanic Garden (well known as the Jardin des Plantes) connected with it, are rich and valuable collections.

There are numerous important libraries, six of which are public. The chief among them is the King's Library, with above 500,000 volumes, 80,000 MSS., 1,600,000 engravings, and 100,000 medals and coins.

There are numerous learned societies, at the head of which is the Institute (Institut National). The charitable institutions are various, and are liberally endowed and supported.

PARIS, also called ALEXANDER, was the son of Priam, king of Troy, and Hecuba. He carried off Helena from Sparta during the absence of her husband Menelaus, and took her to Troy, which was the cause of the Trojan war. He is one of the personages of Homer's 'Iliad,' but he plays only a subordinate part.

PARIS, MATTHEW, was born about the end of the 12th century, took the religious habit in the Benedictine monastery of St. Alban's in 1217, and died there in 1259. Almost the only incident of his life that has been recorded is a journey he made to Norway, by command of the pope, to introduce some reforms into the monastic establishments of that country. His acquirements embraced all the learning and science of his age. His memory is now preserved by his history of England, entitled 'Historia Major,' which begins with the Norman Conquest, and comes down to the year of the author's death. His work is continued to the death of Henry III. (A.D. 1272) by William Rishanger, a monk of the same abbey.

PARIS, a genus of plants belonging to the natural order *Asparageæ*. *P. quadrifolia*, Herb Paris, the only British species, is found in damp woods in England. It is considered to be a narcotico-acrid poison. *P. polyphylla*, a native of Nepaul, possesses similar properties.

PARISH. This word is derived from the French *paroisse*, and the Latin *parochia* or *paroscia*, and ultimately from the Greek *paroikia* (παροικία). At the present day it denotes a circumscribed territory, varying in extent and population, but annexed to a single church, whose incumbent or minister is entitled to the tithes and spiritual offerings within the territory. In the early ages of Christianity the term appears to have been used in some parts of Europe to signify the district or diocese of a bishop, as distinguished from the 'provincia' of the archbishop, or metropolitan. (Du Cange, 'Glos.,' ad verb. 'Parochia;' Selden's 'History of Tithes,' chap. vi. s. 3.) These large ecclesiastical provinces were gradually broken down into subdivisions, for which ministers were appointed, either permanently or occasionally, who were under the rule of the bishop, were paid out of the common treasury of the bishopric, and had no particular interest in the oblations or profits of the church to which their ministry applied. This was the state of things in the primitive times, and it probably continued for some time.

It seems probable that the creation of parishes in England was gradual, and was not fully effected till near the time of the Conquest. As population increased, the means of divine worship supplied by the bishoprics and monasteries were inadequate, and lords of manors began to build upon their own demesnes churches and oratories for the religious purposes of their families and tenants. Each founder assigned a district, within which the functions of the minister officiating at his church were to be exercised, and the burden as well as the advantages of his ministry were limited to the inhabitants of that district. The bishops consecrated the places of worship, and consented that the minister or incumbent should be resident at his church, and receive for his maintenance, and for the use of that particular church, the tithes and offerings of the inhabitants, as well as any endowment or salary which the founder annexed to it. This endowment or salary usually consisted of a glebe, or a portion of land appropriated to that purpose, the produce of which, and of the ecclesiastical profits which arose within the territory limited by the founder, became the settled revenue of the church, and annexed to it in perpetuity. The last concession made to the lay-founder was probably the patronage or right of presenting the clerk to the church, which, by the primitive constitution, belonged exclusively to the bishop; and, when this was obtained, these limited territories differed in no material respect from our modern parishes. Indeed it can scarcely admit of doubt, that our parochial divisions arose chiefly from these lay foundations, the differences in extent being accounted for by the varying limits appointed for them at their origin. The earliest notice of these lay foundations of parishes is by Bede, about the year 700 ('Hist. Eccl.,' lib. v., c. 4 and 5.)

However satisfactory this account of the origin of parishes may be with reference to country parishes, it furnishes no explanation of the origin of parishes in towns—a subject which is involved in great obscurity; and indeed the changes which the latter may be shown to have undergone, within time of memory, seem to point to a different principle of formation.

The country parishes appear to be nearly the same in name and number at the present time as they were at the time of Pope Nicholas's 'Taxation,' compiled in the reign of Edward I. (A.D. 1288); but in some of the large towns the number of parishes has very considerably decreased. The size of English parishes varies much in different districts. In the northern counties they are extremely large; and, generally speaking, parishes in the north are said to average seven or eight times the area of the southern counties. (See Rickman's 'Preface to Population Returns of 1831.') The number of parishes in England and Wales (meaning by the term simply a district annexed to a church, whose incumbent is by law entitled to the perception of tithes in that district,) may be taken to be about 11,000.

PARISH CLERK, a person whose duty it is to assist the parson in the rites and ceremonies of the church. He is generally appointed by the incumbent. In churches or chapels erected under the Church Building Acts the clerk is appointed annually by the minister. In some places the parish clerk is chosen by the inhabitants. In small parishes the offices of parish clerk and sexton are united in one person. In 1844 an act was passed (7 & 8 Vict. c. 54) 'for better regulating the offices of lecturers and parish clerks.'

PARK. This term, in its legal signification as a privileged inclosure for beasts of the forest and chace, is at the present day nearly obsolete. Under the ancient forest-laws, the franchise of the highest degree was that of a forest, which was the most comprehensive name, and contained within it the franchises of chace, park, and warren. The only distinction between a chace and a park was, that the latter was inclosed, whereas a chace was always open, and they both differed from a forest, inasmuch as they had no peculiar courts, nor any particular laws, being subject to the general laws of the forest; or, as Sir Edward Coke maintains, to the common law exclusively of the forest-laws (4 'Inst.,' 314). According to the legal meaning of the term, no subject can set up a park without the king's grant, or immemorial prescription, which is presumptive evidence of such a grant. In modern times the term is little known, except in its popular acceptation as an inclosure for the real or ostensible purpose of keeping deer.

PARK, MUNGO, was born Sept. 10, 1771, at Fowlshiels, on the banks of the Yarrow, not far from Selkirk in Scotland. His father was an intelligent and successful farmer. At the age of 15 Mungo Park was apprenticed to Mr. Thomas Anderson, a surgeon in Selkirk, with whom he resided three years. In 1789 Park removed to the university of Edinburgh. There is nothing left on record of his academical life, except that he devoted considerable attention to botany. On the completion of his studies at Edinburgh, Park repaired to London, where he was introduced to Sir Joseph

Banks, through whose interest he obtained the appointment of assistant-surgeon to the Worcester, East Indiaman. He sailed in Feb. 1792 on a voyage to Sumatra, and returned to England in the course of the following year. Soon after Park's return he offered his services to the African Association to become the successor of Major Houghton in exploring the course of the Niger. He sailed from England May 22, 1795, and reached Pisania, a British factory about 200 miles up the Gambia, July 5. He left Pisania Dec. 2, 1795. After passing through the territories of a number of petty negro chiefs, he was induced to adopt a more northerly route across the territory of Ludamar, then governed by the chief of a predatory horde of nomade Moors. He reached Yarra, the frontier town of this state, Feb. 18, 1796. Ali, the Moorish chief, detained him a captive till the 1st of July. When Park made his escape he possessed nothing more than a horse with its accoutrements, a few articles of clothing, and a pocket-compass. Undismayed by his destitute condition, he pushed on to the Nil el Abid, or Joliba, which he reached at Sego, after a journey of fifteen days: he explored the stream downwards to Silla and upwards to Bammakoe, then crossed a mountainous country to Kamalia, a Mandingo town, which he reached Sept. 14. Here, 500 miles from the nearest European settlement, his health gave way. For upwards of a month he was rendered helpless by a fever, and was detained in the same place five months after his recovery, before he could obtain the means of journeying to the coast. At last, June 10, 1797, he returned to Pisania, and was received by Dr. Laidley, with whom he had previously stayed, 'as one risen from the dead.' His lonely and toilsome wanderings had occupied upwards of 19 months.

On his return to England the composition of a narrative of his travels occupied him till the spring of 1799, when it was published. His principal place of residence while engaged upon it was London. The profits of publication and the liberal remuneration he received from the African Association placed him for the moment in easy circumstances.

In 1799 he retired to his native country, and in the August of that year married the daughter of Mr. Anderson, with whom he had served his apprenticeship. Two years afterwards he settled at Peebles, and obtained practice as a surgeon; but he was not in his element, and his mind still ran on foreign adventure. In the autumn of 1803 he accepted a proposal from government that he should command an expedition of discovery into the interior of Africa, and on Jan. 30, 1805, the expedition sailed from Portsmouth. Park had adopted the opinion that the Congo and the Niger were one stream; and his plan was, with a supply of merchandise sufficient to defray travelling expenses, and a body of soldiers sufficient to insure immunity from hostile attacks, to cross from the Gambia to the Niger, and then sail down the stream to the ocean. The expedition left Pisania May 4, 1805, and arrived at Foulah Dougou with 33 white men. From Foulah Dougou to Sego (which was eight days' march, but which is generally performed in three days by a negro), they lost 26 men by the rains, damps, &c.

At Sansanding Park engaged a man named Amadi Fatouma to guide him to Boussa. From this man was procured the only direct contemporary evidence regarding the fate of Park and his companions that has been obtained. His accuracy however is established by a strong body of circumstantial evidence. He stated that in sailing down the Niger they had repeated engagements with the natives; that on arriving at Yaouri, Fatouma's engagement having terminated, he quitted Mr. Park; that after Mr. Park's departure, the chief of Yaouri informed the king (falsely) that the white men had departed without giving the customary present; that the king in rage imprisoned Fatouma, and sent an armed force to intercept the white men at the narrows of the river; that on his release from prison Fatouma learned from a slave (the only survivor of Park's party) that during a skirmish which ensued the boat was sucked into a rapid, and that the white men, in attempting to make their escape, were drowned. Thus perished Mungo Park, towards the close of 1805, in the 35th year of his age.

PARK OF ARTILLERY, an assemblage of the heavy ordnance belonging to an army, with its carriages, ammunition waggons, and stores, on ground contiguous to that which is occupied by the troops when encamped.

The park is formed in the immediate vicinity of roads by which the artillery may be readily moved to any spot where its service may be required: it is usually in rear of the troops, the guns being arranged in one line if the ground will permit. At the siege of a fortress the park is situated between the army and the place, and it should be beyond the range of the artillery of the latter. If possible, it should be behind some rising ground, and on a spot from whence the artillery may be speedily brought up to the trenches or batteries.

A quarter-guard, as it is called, is posted at a certain distance from and opposite the middle of the front of the park: the gunners' tents are arranged along the two flanks; those of the commissioned officers are in the rear; and behind them the horses are generally picketed in one line or more, parallel to that of the guns.

PARKER, MATTHEW, Archbishop of Canterbury, born 1504, died 1575, was a native of the city of Norwich. He was educated at Corpus Christi College, Cambridge, and being intended for the church, was so diligent in his studies, especially of the Scriptures and the Fathers, that before he was 30 he was fixed upon by Wolsey to be one of his professors in the college which he meant to found at Oxford. This honour however Parker declined, probably in consequence of having attached himself to the reforming party in the church. At this early period of his life he had a licence to preach. Besides having two or three benefices, he was made an archdeacon in 1526; dean of the college of Stoke Clare, his favourite piece of preferment, 1535; one of the king's chaplains, 1537; master of Corpus Christi College, 1544; dean of Lincoln, 1552. In 1545 he was vice-chancellor

of his university. He took a wife in 1547. This step obliged him to live in retirement during the reign of Mary, but very soon after her death he was summoned from his retirement, and induced to accept at once the high dignity of Archbishop of Canterbury. His consecration took place on Dec. 17, 1559. He was archbishop more than 15 years, during which time he was assiduously employed in watching over the interests of the new-formed church, and in giving it that consistency and order which the church of England has since maintained. The preparation of the great work called the Bishops' Bible was performed under his auspices, and the work was completed in 1568. He collected a large library of valuable manuscripts, which he gave to his college in Cambridge, where he founded also divers fellowships and scholarships.

PARKHURST, JOHN, was the second son of John Parkhurst, Esq., of Catesby in Northamptonshire. He was born in June, 1728, and educated at Rugby Grammar-School, and afterwards at Clare Hall, Cambridge, where he took his degree of B.A. in 1748, and that of M.A. in 1752. He was for some years a fellow of his college. He took orders in the church of England, but never obtained any preferment. Parkhurst died at Epsom in March, 1797. He was a man of excellent character, and an indefatigable student. His principal works are a Hebrew and English Lexicon without points, and a Greek and English Lexicon to the New Testament, both of which have been much used, but are now superseded by better works.

PA'RKIA, a genus of plants of the natural family or tribe or *Mimoseæ*. The genus contains only a few unarmed trees, which are found on the west coast of Africa, the peninsula of India, Silhet, and in the islands to the eastward of the Bay of Bengal. *P. Africana* is the Doura-Tree of Soudan. The farinaceous matter surrounding the seeds is eaten, and also made into a pleasant drink when steeped in water. The seeds are roasted as coffee is with us, then bruised and allowed to ferment in water.

PARKINSO'NIA ACULEA'TA, or the Barbadoes Flower-Fence, is a well-known West Indian shrub, very generally employed in such climates as an ornamental plant, and especially for the construction of hedges, for which its strong spines render it well adapted.

PARLIAMENT, IMPERIAL, the legislature of the United Kingdom of Great Britain and Ireland, consisting of the king or queen, the lords spiritual and temporal, and the knights, citizens, and burgesses in parliament assembled.

The word is generally considered to be derived from the French 'parler,' to speak. 'It was first applied,' says Blackstone, 'to general assemblies of the states under Louis VII. in France, about the middle of the 12th century.' The earliest mention of it in the statutes is in the preamble to the statute of Westminster, A.D. 1272.

Great councils of the nation existed in England both under the Saxons and the Norman kings.

Coke, Spelman, Camden, and Prynne agree that the Commons formed part of the great synods or councils before the Conquest; but how they were summoned, and what degree of power they possessed, is a matter of doubt and obscurity.

The origin of the present House of Commons is referred to the writs issued in 1256, by Simon de Montfort, earl of Leicester, while Henry III. was his prisoner. These writs required each sheriff of a county, together with two knights for his shire, to send two citizens for each city, and two burgesses for each borough, within the limits of the shire. Whatever may have been the effect of this summons, we know that Edward, King Henry's son, after he became king in the 23rd year of his reign, adopted this system of calling together knights, citizens, and burgesses, as an easier mode of raising money than the arbitrary measures of his predecessors. It was also an advantage to the citizens and burgesses, for the practice of calling them together at the same times and places as the great council of the king, led to their obtaining a certain degree of political power. In 1297, the 25th year of Edward I., a statute was made, which declared that 'no tallage or aid shall be taken or levied by us, or our heirs, in our realms, without the good-will and assent of the archbishops, bishops, earls, barons, knights, burgesses, and other freemen of the land.' Thus the representative freeholders, or knights of the shires, were united with the representative citizens and burgesses in one assembly. In 1327, in the writs issued by Edward III. to the sheriffs to proclaim himself king, the knights, citizens, and burgesses, are comprehended in the term Commons, as opposed to the 'prelates, barons, and other great men.' In the reign of Edward III. the Commons claimed, and their claim was allowed by the king, a veto upon all enactments affecting those great bodies of the people which they represented. They declared to the king in parliament that they would not be compelled by any of his statutes or ordinances made without their assent. When the Commons became strong enough to exercise some control over all the great measures of government, the composition of this body became an object of solicitude to the crown. There could be no dispute as to the title of the counties to send their representatives to the national assembly, but that of the boroughs might be disputed, and their rights were sometimes attacked by the crown; but acts of parliament were passed to check all attempts of this kind, the agents in which were the sheriffs. After the House of Commons was established as a separate legislative body, it began itself to narrow the suffrage in the constituent bodies; and the earliest measure of this kind is that of the 8th of Henry VI., which restricted the county franchise, formerly possessed by all freeholders, to those whose freeholds were worth clear forty shillings a year, a sum at least equal to 20*l.* of the present day.

The borough representation was the object of attack under the later reigns of the Tudors, and this system was carried to its utmost limits by the Stuarts. These hostile measures to the liberties of the subject consisted in creating or reviving parliamentary boroughs, and altering their municipal constitutions according to the views of the

crown; and also assimilating the municipal constitutions of the old parliamentary boroughs to those of the newly-created class. Of the 46 parliamentary boroughs created in the reigns of Edward VI., Mary, and Elizabeth, 27 appeared in Schedule A of the Reform Act of 1832, and 5 of the same number in Schedule B. The last borough created by charter was the borough of Newark, in the reign of Charles II.

The Triennial Act of 6 & 7 William and Mary, c. 7, deprived the crown of the power of continuing the same House of Commons for a longer period than three years, an enactment which was in favour of electoral freedom. In the reign of William III. were also passed, in compliance with public opinion, the several acts which disqualify various classes of placemen for seats in the Commons' House. The union with Scotland, in 1707 (6 Anne, c. 8), added to the English, which then became the British House of Commons, 30 members for counties, and 15 for cities and boroughs. Another act of this reign (9 Anne, c. 5) established a qualification of landed property for English members, both for counties and boroughs. In the reign of Henry VI. (23 Henry VI., c. 14) a freehold qualification of 40*l.* a year was required for knights of the shires. The statute of Anne raised this qualification, and also extended the principle to citizens and burgesses, by requiring them to have a freehold or copyhold qualification of 300*l.* a year, one half of the qualification of a knight of the shire. The 1 George I., commonly called the Septennial Act, extended the legal duration of parliaments from three years to seven.

By an act of parliament passed in 1800, which took effect from the 1st of January, 1801, the parliamentary representation of Ireland was incorporated with that of Great Britain. Sixty-four members for counties, thirty-five for cities and boroughs, and one member for Dublin University, were added to the British House of Commons.

The last great change in the House of Commons was effected by the Reform Acts of 1832, 2 Wm. IV., c. 45, for England, 2 & 3 Wm. IV., c. 65, for Scotland, and 2 & 3 Wm. IV., c. 88, for Ireland. This measure was the consequence of opinion operating on the two houses, which opinion was strengthened by the French Revolution of 1830, which made Charles X. an exile, and placed Louis Philippe on the throne of France. The changes under the Reform Acts were very numerous, and it is impossible to enumerate them in shorter terms than they are expressed in the acts. The number of county constituencies in England was increased from 52 to 82 by dividing many of the counties, and the number of county members was increased from 94 to 159. Fifty-six boroughs in England and Wales were disfranchised; and 30 boroughs had their right of sending two members reduced to the right of sending one; and two members were taken away from the four formerly sent by the united boroughs of Weymouth and Melcombe Regis. In all 143 members were taken away from these boroughs. Sixty-five out of this number of 143 members were by the Reform Act to be returned by 43 new boroughs. As to the alteration in the number of representatives for Ireland and Scotland, the matter of boundary, the qualifications of an elector, or the elective franchise, and other matters included in the Reform Acts, and the Boundary Act, these statutes must be consulted by those who wish to be fully acquainted with the subject. Among the great advantages secured by these acts are—the division of counties and boroughs into convenient polling districts, the shortening of the time of polling, and the registration of electors.

The repeal of the Corporation and Test Acts in 1828, and the passing of the Catholic Emancipation Act in 1829, have worked one very important alteration in the constitution of the Commons' House, by removing nearly altogether the religious disqualifications which previously existed. The engagement 'on the true faith of a Christian,' to abstain from all designs hostile to the church as by law established, which the latter act has substituted for the oath and declaration formerly required, excludes no man professing Christianity in however general terms, and seems indeed to have no effective operation but against the Jews, to whose admission this bar is still opposed.

The qualification for an English, Welsh, or Irish member was not altered by the Reform Acts, and was—for a county member a clear estate of freehold or copyhold of 600*l.* a year, and for a city or borough member, 300*l.* To represent a university no property qualification is requisite. In 1838 an act was passed (2 Vict. c. 48), which amends the laws relating to the qualifications of members to serve in parliament: a knight of the shire must be entitled, for his own use and benefit, to real or personal property, or both together, to the amount of 600*l.* a year; and to be a citizen or burgess, only one-half the qualification is required. The only *personal* exceptions from this condition are in favour of the eldest sons of peers, of bishops having seats in the House of Lords, and of persons legally qualified to be county members. The qualifying property may be situated in any part of England, Wales, Ireland, or Berwick-upon-Tweed. As regards the Scottish part of the representation, it is worthy of remark, that the property qualifications enacted for England within a very few years after the union with Scotland, have never been extended to the latter portion of the kingdom; and that consequently the conditions of suffrage and of eligibility have remained there, according to the original constitution of the representative system in both countries, one and the same, excepting only the anciently essential condition of *residence*, which has long been done away throughout the United Kingdom without any reservation or limitation whatever; and excepting also that the Scottish Reform Act of 1832 has rendered unnecessary for county members the qualification of an *elector* formerly required.

Constituent Parts of Parliament.

Of the king (or queen), nothing need be repeated in this place.

The House of Lords is at present composed of—

Lords Spiritual.

Archbishops (York and Canterbury)	2
English Bishops	24
Irish Representative Bishops	4
Total	30

Lords Temporal.

Princes of the Blood Royal	3
Dukes	20
Marquesses	21
Earls	115
Viscounts	22
Barons	199
Representative Peers of Scotland	16
Representative Peers of Ireland	28
Total	424

The number has been greatly augmented from time to time, and there is no limitation of the power of the crown to add to it by further creations. The introduction of the representative peers of Scotland and Ireland was effected on the union of those kingdoms, respectively, with England. The former are elected by the hereditary peers of Scotland descended from Scottish peers at the time of the Union, and sit for one parliament only; the latter are chosen for life by the peers of Ireland, whether hereditary or created since the Union. The power of the crown to create Irish peers is limited by the Act of Union, so that one only can be created whenever three of the peerages of Ireland have become extinct.

The present composition of the House of Commons is as follows:—

England and Wales.

Knights of Shires	159
Citizens and Burgesses	341
Total.	500

Scotland.

Knights of Shires	30
Citizens and Burgesses	23
Total	53

Ireland.

Knights of Shires	64
Citizens and Burgesses	41
Total	105

Total of the United Kingdom, 658

But this includes the borough of Sudbury disfranchised for gross corruption by 7 & 8 Vict. c. 53; and the two members which this borough formerly returned have not yet been transferred to any other place.

The lords and commons originally were one assembly, but the date of their separation is not known.

Power and Jurisdiction of Parliament.

1. *The Legislative Authority collectively.*—The authority of parliament extends over the United Kingdom and all its colonies and foreign possessions. There are no other limits to its power of making laws for the whole empire than those which are common to it and to all other sovereign authority, the willingness of the people to obey, or their power to resist them.

Parliament does not in the ordinary course legislate directly for the colonies. For some, the queen in council legislates, and others have legislatures of their own, and propose laws for their internal government, subject to the approval of the queen in council; but these may afterwards be repealed or amended by acts of parliament. Their legislatures and their laws are both subordinate to the supreme power of the mother country. The constitution of Lower Canada was suspended in 1840; and a provisional government, with legislative functions and great executive powers, was established by the British parliament. Slavery was abolished by an act of parliament in 1833 throughout all the British possessions, whether governed by local legislatures or not; but certain measures for carrying into effect the intentions of parliament were left for subsequent enactment by the local bodies, or by the queen in council.

The power of imposing taxes upon colonies for the support of the parent state was attempted to be exercised by parliament upon the provinces of North America; but this attempt was the immediate occasion of the severance of that country from Great Britain.

2 *Distribution of Powers between King, Lords, and Commons.*—Custom and convenience have assigned to different branches of the legislature peculiar powers. The king swears at the coronation to govern 'according to the statutes in parliament agreed upon,' and these of course may be altered. Any prerogative of the crown may be taken away by the king, with the consent of the three estates of the realm. The king sends and receives ambassadors, enters into treaties with foreign powers, and declares war or peace, without the concurrence of lords or commons; but he cannot do these things without the advice of his ministers, who are responsible to parliament. Certain parliamentary functions are exercised by the king, which are important in the conduct of legislation.

Summons.—It is by the act of the king alone that parliament can be assembled. There have been only two instances in which the lords and commons have met of their own authority, namely, previously to the restoration of King Charles II., and at the Revolution in 1688. But although the king may determine the period for calling parliaments, his prerogative is restrained within certain limits, and he is bound by statute to issue writs within three years after the determination of any parliament; and the practice of providing money for the public service by annual enactments renders it compulsory upon him to summon parliament every year.

There is one contingency upon which the parliament may meet without summons, under the authority of an act of parliament. It was provided by the 6 Anne, c. 7, 'that in case there should be no parliament in being at the time of the demise of the crown, then the last preceding parliament should immediately convene and sit at Westminster, as if the said parliament had never

been dissolved.' By the 37 Geo. III., c. 127, a parliament so revived would only continue in existence for six months, if not sooner dissolved.

As the king appoints the time and place of meeting, so also at the commencement of every session he declares to both houses the cause of summons by a speech delivered to them in the House of Lords, by himself in person, or by commissioners appointed by him. Until he has done this, neither house can proceed with any business.

Prorogation and Adjournment. — The king may prorogue parliament by having his command signified in his presence by the lord chancellor or speaker of the House of Lords to both houses, or by writ under the great seal, or by commission. The effect of a prorogation is to suspend all business until parliament may be summoned again. Not only are the sittings of parliament at an end, but all proceedings pending at the time, except impeachments by the commons, are quashed. A bill must be renewed after a prorogation, as if it had never been introduced, though the prorogation be for no more than a day. There has been some exception recently allowed with respect to private bills.

Adjournment is solely in the power of each house respectively.

Dissolution.—The king may put an end to the existence of parliament by a dissolution; but after seven years it ceases to exist under the statute of George I., commonly known as the Septennial Act. Before the Triennial Act, 6 Wm. and Mary, there was no limit to the continuance of a parliament, except the will of the king. Parliament is dissolved by proclamation, after having been prorogued to a certain day.

The judicial functions of the lords, and their power to pass bills affecting the peerage, which the commons may not amend, are the only properties peculiar to them, apart from their personal privileges.

Taxation. — The chief powers vested in the House of Commons are those of imposing taxes and voting money for the public service. Bills for these purposes can only originate in that house, and the lords may not make any alterations in them, except for the correction of clerical errors. On the opening of parliament, the king directs estimates to be laid before the house, but the amount may be varied by the commons at pleasure. Grants distinct from those proposed in the estimates cannot be made without the king's recommendation being signified.

Right of determining Elections.—The commons determine all matters touching the election of their own members, and involving the rights of the electors.

Oaths. — The power of administering oaths exercised by the lords is not claimed by the House of Commons. Witnesses before the commons, who are guilty of falsehood, are punished by the house for a breach of privilege. Election committees have power by statute to administer oaths, and witnesses who give false evidence before such committees are guilty of perjury.

3. *Privileges.*—Both houses of parliament possess various powers and privileges for the maintenance of their authority, and for the protection, convenience, and dignity of individual members. At the commencement of each parliament, the Speaker, on behalf of the commons, has 'laid claim to them of the king' since the reign of Hen. VIII., but they appear to have been always enjoyed with equal certainty before that time.

Commitment and Fines.—The power of commitment for contempt has always been exercised by both houses. Breaches of privilege committed in one session may be punished by commitment in another, as in the well-known case of Murray, in 1751-2, who was imprisoned in Newgate for a libel until the end of the session, and on the next meeting of parliament was again ordered to be committed; but he had absconded in the meanwhile. Contempts of a former parliament may also be punished. The lords may commit for a definite period beyond the duration of the session or parliament; but a commitment by the commons holds good only until the close of the session.

The house of lords, in addition to the power of commitment, may impose fines. This privilege is not exercised by the commons; though it was formerly. But a practice still exists which partakes of the nature of a fine. There are certain fees payable by persons committed to the custody of the serjeant-at-arms, and it is usual on discharging them out of custody to attach the condition of the 'payment of the fees.'

Freedom of Speech.—Freedom of speech is one of the privileges claimed by the Speaker on behalf of the commons, but it has long since been confirmed as the right of both houses of parliament by statutes. The most solemn recognition of the privilege is contained in the Bill of Rights, which declares 'that the freedom of speech and debates and proceedings in parliament ought not to be impeached or questioned in any court or place out of parliament.' But if a member publish his speech, and it contain libellous matter, he is not protected by the privilege of parliament.

Freedom from Arrest.—The Speaker's petition prays on behalf of the commons, 'that their persons, *their estates, and servants*, may be free from arrests and all molestations.' These words are not more extensive than the privilege as formerly enjoyed, and instances in which it has been enforced may be found in nearly every page of the earlier volumes of the Journals. This privilege has however been limited by statutes, the last of which (10 Geo. III. c. 50) states in the preamble that the previous laws were insufficient to obviate the inconveniences arising from the delay of suits by reason of privilege of parliament, and enacts that 'any person may at any time commence and prosecute any action or suit, &c., against any peer or lord of parliament, or against any of the knights, citizens, or burgesses for the time being, or against any of their menial or any other servants, or any other person entitled to the privilege of parliament, and no such action shall be impeached, stayed, or delayed by or under colour or pretence of any privilege of parliament.' Obedience to any rule of the courts at West-

minster may be enforced by distress infinite, in case any person entitled to the benefit of such rule shall choose to proceed in that way.

The persons of members are still free from arrest or imprisonment in civil actions, but their property is as liable to the legal claims of all other persons as that of any private individual. Their servants no longer enjoy any privilege or immunity.

The privilege of freedom from arrest has always been subject to the exception of cases of 'treason, felony, and surety of the peace;' and though in other criminal charges each house may, if it see fit, prevent the abstraction of a member from his parliamentary duties, the case of Lord Cochrane, in 1815, shows how little protection the House of Commons extends to its members in such cases.

Peers and lords of parliament are always free from arrest on civil process; and as regards the Commons, their privilege is supposed to exist for 40 days after every prorogation and 40 days before the next appointed meeting.

Jurisdiction of Courts of Law in Matters of Privilege.—In connection with the exercise of privilege, an important point of law arises as to the jurisdiction of courts of justice. It is one of great interest and still greater doubt at the present moment, and has at various times been the occasion of much dispute and difficulty. Each house of parliament is acknowledged to be the judge of its own privileges; and the degree of jurisdiction to be exercised by the courts and the proper mode of dealing with actions involving matters of privilege, is difficult to determine, after the inconsistencies which have appeared in practice and the great variety of opinions expressed by learned men.

Mr. May remarks ('Law, Privileges, &c. of Parliament') that 'The present position of privilege is, in the highest degree, unsatisfactory. Assertions of privilege are made in parliament, and denied in the courts; the officers who execute the orders of parliament are liable to vexatious actions, and if verdicts are obtained against them, the damages and costs are paid by the Treasury. The parties who bring such actions, instead of being prevented from proceeding with them by some legal process acknowledged by the courts, can only be coerced by an unpopular exercise of privilege, which does not stay the actions. If parliament were to act strictly upon its own declarations, it would be forced to commit not only the parties, but their counsel and their attorneys, the judges and the sheriffs; and so great would be the injustice of punishing the public officers of justice for administering the law according to their consciences and oaths, that parliament would shrink from so violent an exertion of privilege. And again, the intermediate course adopted in the case of Stockdale *v.* Hansard, of coercing the sheriff for executing the judgment of the court, and allowing the judges who gave the obnoxious judgment to pass without censure, is inconsistent in principle, and betrays hesitation on the part of the house, distrust of its own authority, or fear of public opinion,' (p. 129, 130).

Forms of Procedure.

Meeting of Parliament: Preliminary Proceedings.—On the meeting of a new parliament it is the practice for the Lord Chancellor, with other peers appointed by Commission under the great seal for that purpose, to open the parliament by stating 'that her Majesty will, as soon as the members of both houses shall be sworn, declare the causes of her calling this parliament; and it being necessary a Speaker of the House of Commons should be first chosen, that you, gentlemen of the House of Commons, repair to the place where you are to sit, and there proceed to the appointment of some proper person to be your Speaker; and that you present such person whom you shall so choose here, to-morrow (at an hour stated) for her Majesty's royal approbation.' The commons then proceed to the election of their Speaker.

When the Speaker has been approved by the crown, which is now a matter of form, he lays claim on behalf of the Commons, 'by humble petition, to all their ancient and undoubted rights and privileges,' which being confirmed, the Speaker with the Commons retires from the bar of the House of Lords.

Both houses then take the oaths required by law. In the Commons the Speaker takes them before any other member. Three or four days are usually occupied in this duty before the queen declares to both houses, in person or by commission, the causes of calling the parliament. From this time business proceeds regularly. The first thing usually done in both houses is to vote an address in answer to the speech from the throne.

Before any business is undertaken, prayers are read; in the House of Lords by a bishop, and in the Commons by their chaplain.

Bills, Public and Private.—Bills are divided into two classes—such as are of a public nature affecting the general interests of the state, and such as relate only to local or private matters. The former are introduced directly by members; the latter are brought in upon petitions from the parties interested, after the necessary notices have been given, and all forms required by the standing orders have been complied with.

With few exceptions, public bills may originate in either house, unless they be for granting supplies of any kind, or involve directly or indirectly the levying or appropriation of any tax or fine upon the people. The exclusive right of the commons to deal with all legislation of this nature affects very extensively the practice of introducing private bills into either house. Thus, all those which authorise the levying of local tolls or rates are brought in upon petition to the lower house. These compose by far the greater part of all private bills. All measures of local improvement, whether for inclosing land, lighting, watching, and improving towns, establishing police, or making roads, bridges, railways, canals, or other public works, originate in the Commons. On the other hand, many bills of a personal nature are always sent down from the Lords, such as bills affecting private estates, and for dissolving marriages. As a question of principle it is perhaps unavoidable

that so large a proportion of bills must begin in one house, but much obstruction to business and a very unequal division of labour are the results of the practice, which will be relieved, in some measure, by an arrangement made in regard to railway bills. Bills affecting the peerage must originate in the Lords, and acts of grace with the crown, where the prerogative of mercy is vested.

Progress of Bills: Public Bills.—In the House of Lords any member may present a bill; and in the Commons motions for leave to bring in bills of a public nature are not very frequently refused. The more usual time for opposing any measure in its progress is on the second reading, when all the provisions are known, and the general principle and effect of them may be considered. When leave is given to bring in a bill, certain members are ordered to prepare it, who are the proposer and seconder of the motion, to whom others are sometimes added. It is then brought in and read a first time, and a day is fixed for the second reading, which generally leaves a sufficient interval for the printing and circulation of the bill.

The second reading is the occasion on which a bill is more particularly discussed. Its principle is at that time made the subject of discussion, and if it meet with approval, the bill is committed, either to a committee of the whole house or to a select committee, to consider its several provisions in detail. A committee of the whole house is in fact the house itself, in the absence of the Speaker from the chair; but the rule which allows members to speak as often as they think fit, instead of restricting them to a single speech, as at other times, affords great facilities for the careful examination and full discussion of details. The practice of referring bills of an intricate and technical description to select committees has become very prevalent of late years, and might be extended with advantage. Many bills are understood by a few members only, whose observations are listened to with impatience, and thus valuable suggestions are often withheld in the house, which in a committee might be embodied in the bill. By leaving such bills to a select committee, the house is enabled to attend to measures more generally interesting, while other business, of perhaps equal importance, is proceeding at the same time; and it has always the opportunity of revising amendments introduced by the committee.

Before a bill goes into committee there are certain blanks for dates, amount of penalties, &c., which are filled up in this stage. Bills of importance are often recommitted, or in other words, pass twice, and even in some instances three or four times, through the committee. When the proceedings in committee are terminated, the bill is reported with the amendments to the house, on which occasion they are agreed to, amended, or disagreed to, as the case may be. If many amendments have been made, it is a common and very useful practice to reprint the bill before the report is taken into consideration. After the report has been agreed to, the bill with the amendments is ordered to be ingrossed previous to the third reading. A proposition was made not long since, but without success, for discontinuing the custom of ingrossment upon parchment, and for using an examined copy of the printed bill, signed by the clerk of the house, for all the purposes for which the ingrossed copy is now required.

The third reading is a stage of great importance, in which the entire measure is reviewed, and the house determines whether, after the amendments that have been made in previous stages, it is fit on the whole to pass and become law. The question, 'that this bill do pass,' which immediately succeeds the third reading, is usually no more than a form, but there have been occasions on which that question has been opposed, and even negatived. The title of the bill is settled last of all.

An interval of some days usually elapses between each of the principal stages of a bill; but when there is any particular cause for haste, and there is no opposition, these delays are dispensed with, and the bill is allowed to pass through several stages, and occasionally through all, on the same day.

This statement of the progress of bills applies equally to both houses of parliament. There is however a slight distinction in the title of a bill while pending in the lords, which is always intitled 'an act,' whether it has originated in the Lords or has been brought up from the Commons.

When the Commons have passed a bill, they send it to the Lords by one of their own members, who is usually accompanied by not less than eight other members. The Lords send down bills by two masters in chancery; unless they relate to the crown or the royal family, in which case they are generally sent by two judges.

Private Bills.—In deliberating upon private bills parliament may be considered as acting judicially as well as in its legislative capacity. The conflicting interests of private parties, the rights of individuals, and the protection of the public have to be reconciled. Care must be taken, in furthering an apparently useful object, that injustice be not done to individuals, although the public may derive advantage from it. Vigilance and caution should be exercised, lest parties professing to have the public interests in view should be establishing, under the protection of a statute, an injurious monopoly. The rights of landowners among themselves, and of the poor, must be scrutinised in passing an inclosure bill. Every description of interest is affected by the making of a railway. Land, houses, parks, and pleasure-grounds are sacrificed to the superior claim of public utility over private rights. The repugnance of some proprietors to permit the line to approach their estates, the eagerness of others to share in the bounty of the company and to receive treble the value of their land, embarrass the decision of parliament as to the real merits of the undertaking, which would be sufficiently difficult without such contentions. If a company receive authority to disturb the rights of persons not interested in their works, it is indispensable that ample security be taken that they are able to complete them so as to attain that public utility which alone justified the powers being intrusted to them. The imprudence of speculators is to be restrained, and unprofitable

adventures discountenanced, or directed into channels of usefulness and profit. In short, parliament must be the umpire between all parties, and endeavour to reconcile all interests.

The inquiries that are necessary to be conducted in order to determine upon the merits of private bills are too extensive for the house to undertake, and it has therefore been usual to delegate them to committees. To prevent parties from being taken by surprise, the standing orders require certain notices to be given (to the public by advertisement, and to parties interested by personal service) of the intention to petition parliament. The first thing which is done by the commons on receiving the petition therefore is to inquire whether these notices have been properly given, and if all other forms prescribed by the standing orders have been observed. This inquiry is confided to a committee, who report their determination to the house; and if it be favourable leave is given to bring in the bill. For the further proceedings on private bills, the reader may refer to the works mentioned at the end of this article.

Conferences between the two Houses.—When a bill has been returned by either house to the other, with amendments which are disagreed to, a conference is desired by the house which disagrees to the amendment, to acquaint the other with the reasons for such disagreement, in order, to use the words of Hatsell, 'that after considering those reasons, the house may be induced, either not to insist upon their amendments, or may, in their turn, assign such arguments for having made them as may prevail upon the other house to agree to them.'

Royal Assent to Bills.—The form of giving the royal assent to bills has already been described. [ASSENT, ROYAL.]

Committees.—Committees are either 'of the whole house' or 'select.' The former are in fact the house itself, with a chairman instead of the Lord Chancellor or Speaker presiding. There is a more free and unlimited power of debate when the house is in committee, as members may speak any number of times upon the same question, from which they are restrained on other occasions. Select committees are specially appointed, generally for inquiring into particular subjects connected with legislation. It is usual to give them the 'power to send for persons, papers, and records;' but in case of any disobedience to their orders, they have no direct means of enforcing compliance, but must report the circumstances to the house, which will immediately interfere.

Trial of Election Petitions.—The mode of proceeding in contested elections is explained in the article ELECTION-COMMITTEES.

Impeachment.—Impeachment by the Commons is a proceeding of great importance, involving the exercise of the highest judicial powers by parliament, and though in modern times it has rarely been resorted to, in former periods of our history it was of frequent occurrence. The earliest instance of impeachment by the Commons at the bar of the House of Lords was in the reign of Edward III. (1376.) Before that time the Lords appear to have tried both peers and commoners for great public offences, but not upon complaints addressed to them by the Commons. During the next four reigns, cases of regular impeachment were frequent, but no instances occurred in the reigns of Edward IV., Henry VII., Henry VIII., Edward VI., Queen Mary, or Queen Elizabeth. The institution 'had fallen into disuse,' says Mr. Hallam, 'partly from the loss of that control which the Commons had obtained under Richard II. and the Lancastrian kings, and partly from the preference the Tudor princes had given to bills of attainder or of pains and penalties, when they wished to turn the arm of parliament against an obnoxious subject.' Prosecutions also in the Star-Chamber during that time were perpetually resorted to by the crown for the punishment of state offenders. In the reign of James I. the practice of impeachment was revived, and was used with great energy by the Commons, both as an instrument of popular power and for the furtherance of public justice. Between the year 1620, when Sir Giles Montressor and Lord Bacon were impeached, and the Revolution in 1688, there are about 40 cases of impeachment. In the reigns of William III., Anne, and George I., there were 15, and in George II. only one (that of Lord Lovat, in 1746, for high treason). The last memorable cases are those of Warren Hastings, in 1788, and Lord Melville, in 1805.

(Coke's *Fourth Institute*, cap. 1; *The Soveraigne Power of Parliaments*, by W. Prynne, 1643; *Parliamentary Writs*, by W. Prynne, in four parts, 1659–1664; *Privileges of the Baronage of England when they sit in Parliament*, by John Selden, 12mo., 1642; *Original Institution, Power, and Jurisdiction of Parliaments*, by Sir M. Hale, 1707; republished by Hargrave, with preface, 1776; *Ancient Right of the Commons of England*, by William Petyt, 1680; *Parliamentary and Political Tracts*, written by Sir Robert Atkins, 2nd edit., 1741; *History of the High Court of Parliament*, by T. Gurdon, 1731; *Manner of holding Parliaments in England*, by Henry Elsynge, Cler. Parl., 1768; D'Ewes's *Journal; Lords' Journals; Commons' Journals; General Indexes and Calendars to Lords' Journals*, 1509–1819; *General Indexes to Commons' Journals*, 1547–1837; Hatsell's *Precedents*, new edit., 1818; *A Treatise upon the Law, Privileges, Proceedings and Usage of Parliament*, by Thomas Erskine May, Esq., 1844.)

PARMA, DUCHY OF, a state in Northern Italy, which extends from the Apennines to the Po, and forms part of the great basin of that river. It is bounded N. by Austrian Lombardy, E. by the Duchy of Modena, W. by the Sardinian territory, and S. by the territories of Genoa, Tuscany, and Modena. The length of the duchy from E. to W. is about 50 miles, and its breadth is from 40 to 45 miles. The area is reckoned at 2280 square miles. The state of Parma consists of three territories, which were formerly separate states, namely, Parma, Piacenza, and Guastalla; and it is divided for administrative purposes into five districts, namely—1, Parma, which contains 82 communes and (in 1846) 153,839 inhabitants; 2, Piacenza, 31 communes and 140,126 inhabitants; 3, Borgo

San Donnino, 28 communes and 130,924 inhabitants; 4, Borgo Taro, 11 communes and 49,341 inhabitants; 5, Guastalla, 3 communes and 22,573 inhabitants. The whole population of the state is 496,803.

The mountain region, which constitutes about one-third of the whole country, is rugged, poor in produce, and bleak in winter. Forests of chestnut-trees clothe the sides of the mountains, and supply the inhabitants with food. The lower hills and plains, which extend between the Apennines and the Po, and along the southern bank of that river, are very fertile, well cultivated, and populous. The principal products are corn of every kind, part of which is exported; pulse, fruit, wine, silk, wool, cattle, and poultry. The cattle and the cheese are celebrated. The chief mineral products are iron, copper, salt, marble, and alabaster.

The mountains of this country all belong to the Apennine range. From them flow the rivers Magra, Tidone, Trebbia, Nura, Taro, Parma, and Lenza: most of these are tributaries of the Po.

The principal towns are—PARMA; PIACENZA; Borgo San Donnino, a bustling town in a fertile plain, with 3000 inhabitants, a bishop's see, a gymnasium, and a clerical seminary; Fiorenzuola, with 3000 inhabitants and a gymnasium; Borgo Taro, the chief town of a district in the highlands of the Apennines, with about 1000 inhabitants, two elementary schools, and an old castle. Guastalla, situated on the river Crostolo, is a bishop's see, has a cathedral, a clerical seminary, a public library of 6000 volumes, and about 3000 inhabitants.

PARMA, the capital of the Duchy, situated in a fine plain about 12 miles south from the Po, is rather more than four miles in circumference, and is surrounded by walls and ditches. It is a bishop's see, and has 36,000 inhabitants. The streets are wide and straight, but appear somewhat dull and deserted. Parma has a Scuola Superiore, or lyceum, with chairs of theology, medicine, and philosophy, attended by about 400 students; a secondary or grammar school, two colleges for boarders, besides a military college, a school for the arts, a house of education for young ladies, numerous elementary schools for boys, and several for girls. The public library, the museum, and the ducal gallery of paintings, are all valuable collections.

Most of the churches of Parma are adorned with paintings by Correggio. The most remarkable buildings are—the cathedral; the baptistery, which is built of marble and adorned with numerous statues and frescoes; St. John the Evangelist; l'Annunziata; and la Madonna della Steccata, which contains the tombs of the dukes of Parma, among others that of Alessandro Farnese. Parma has many charitable institutions; and in the vicinity are elegant villas.

Parma was once a town of the Etruscans, and afterwards of the Boii; it was made a Roman colony at the same time as Mútina (Modena), B.C. 183. (Livy, xxxix. 55.) After the fall of the Western Empire, Parma was subject successively to the Goths, the Longobards, and the Carlovingians. It afterwards governed itself, for a time, as a republic. Parma afterwards was possessed in succession by the Visconti of Milan, and by Can della Scala, lord of Verona, after whose death the citizens placed themselves under the allegiance of the pope; but in 1334 the family of Correggio drove away the papal governor, and took possession of the government. It afterwards returned under the dominion of the Visconti, and then came under the Sforza, dukes of Milan. For three or four centuries the dukes of Parma were feudatories alternately of the popes, the kings of France, and the emperors of Germany; and the dukedom was a fertile subject of strife and contention. Even down to the time of Bonaparte's invasion of Italy, these contested claims were urged. Parma was under the yoke of France from 1796 till 1814; in which year the Congress of Vienna decided that the duchy of Parma and Piacenza should be the appanage of Napoleon's wife, Maria Louisa of Austria, during her lifetime; that the ex-queen of Etruria and her son should have the duchy of Lucca; and that after the death of Maria Louisa of Austria, the Duke of Lucca should be restored to his paternal states of Parma, and Lucca be annexed to the grand-duchy of Tuscany.

PARME'NIDES, the second in the series of the Eleatic philosophers, was a native of Elea. He was descended from a noble family. It is said that he formed a code of laws for his native city, which was highly esteemed. The time when Parmenides lived is somewhat uncertain, but it appears that Socrates when a boy heard Parmenides at Athens. Parmenides taught Empédocles and Zeno. Plato speaks of him with great respect. He wrote a poem on 'Nature,' some fragments of which have been preserved. The best edition of these fragments is by Karsten, Brussels, 1835.

PARME'NIO, a Macedonian general, who distinguished himself in the service of Philip, father of Alexander the Great. He gained a decisive victory over the Illyrians about the time of Alexander's birth. In the Persian expedition of Alexander, Parmenio held a chief command, and he contributed greatly to the victory on the banks of the Granicus, and also to that of Issus and Arbela. When Alexander marched through the Caspian Gates in pursuit of Darius, Parmenio was left with a force in Media. During the campaign of Alexander, Philótas, the son of Parmenio, who was with the king, was charged with conspiracy against him, and was put to death. Messengers were also sent by Alexander to those officers serving under Parmenio with orders to put him to death, and the veteran soldier, then seventy years of age, was assassinated without even the form of a trial. If Philótas was guilty, there is no evidence that Parmenio was; and he was probably sacrificed to mere suspicion and to fear of the vengeance of a father, whose last surviving son had been sacrificed by Alexander, though two of the brothers of Philótas had died in his service. Parmenio had the character of being a brave and prudent officer.

PARMIGIA'NO, FRANCESCO MAZZUOLI,

sometimes called, in the diminutive form, *Parmigianino*, was born at Parma in 1503. He studied painting under his uncles Michele and Filippo and his countryman Marmitta. In his 16th year he finished a picture of the Baptism of Christ. He went in 1523 to Rome, where the sight of the works of Raphael made a deep impression upon him. In his subsequent works he endeavoured to combine with the grace of Raphael the contrasts of Michel Angelo and the grace and harmony of Correggio. On the taking of Rome, 1527, when he sustained considerable loss, he went to Bologna. Among his finest works in Bologna were St. Rochus, painted for the church of St. Petronius, the Madonna della Rosa, now in the Dresden Gallery, which he had changed from a Venus to a Madonna, and the St. Margaret. He afterwards returned to his own country, where he painted the Cupid fashioning his bow, with two infants at his feet, of which there are numerous repetitions, and began to adorn with several paintings the newly-built church della Steccata. But his health being greatly weakened, he was unable to work, and the directors of the building threw him into prison, as he had received a sum of money in advance. They indeed set him at liberty on his promise to complete the work; but, indignant at this treatment, he fled to Casal Maggiore, where he died in 1540. The etchings of Parmigiano are distinguished for their taste, delicacy, and freedom. He was the first to introduce the art of etching into Italy.

PARNASSIA, a genus of plants belonging to the natural order *Droseraceæ*. *P. palustris*, Marsh Grass of Parnassus, is native throughout Europe, in marshy and damp places, and in Britain in mountainous districts. *P. fimbriata* is a very elegant species, native of the western coast of North America.

PARNASSUS (Παρνασσός), the name of a mountain-chain in Phocis, which extends in a north-easterly direction from the country of the Locri O'zolæ to Mount Œta, and in a south-westerly direction through the middle of Phocis, till it joins Mount Helicon on the borders of Bœotia. The name was usually restricted to the lofty mountain upon which Delphi was situated. It is called at the present day Liakura. Parnassus is the highest mountain in Greece, and the summit is covered with snow during a part of the year. Above Delphi are two lofty rocks, whence the mountain is sometimes called 'double-headed' by the poets. Between these two rocks is the Castalian spring, a cool and limpid stream; and above the spring, and several miles from Delphi, is the Corycian cave. Higher up than the cave, and near the summit of the mountain, was the town of Tithórea, or Neon, the ruins of which are near the modern village of Velitza.

PARNELL, THOMAS, was born in Dublin in 1679. He studied at Trinity College, Dublin, and became M.A. in 1700. In the same year he was ordained a deacon, a dispensation having been granted by the bishop of Derry. About three years afterwards he took priest's orders, and in 1705 received the archdeaconry of Clogher from Dr. Ashe, the bishop of the diocese. On the ejection of the Whigs towards the close of Queen Anne's reign, he abandoned that party, and was cordially welcomed as an adherent by the Oxford administration, which did not last after the queen's death. On the recommendation of Swift however he obtained a prebend from Archbishop King in 1713: and in May, 1716, was presented to the vicarage of Finglass. He died at Chester, on his way from London to Ireland, in July, 1717. A selected edition of his poems was published by Pope soon after his death, and dedicated to the Earl of Oxford. Parnell was also the author of the 'Life of Homer', prefixed to Pope's translation of the 'Iliad,' of certain papers in the 'Spectator' and 'Guardian,' and various unacknowledged performances.

PARNES. [Attica.]

PARODY, a comic imitation of a serious composition, usually poetical. It had its origin among the Greeks, from whose language the name (παρῳδία) is derived. It seems to be synonymous with the French *Travestie*.

PAROL. This term, which signifies 'a word,' has been adopted from the Norman-French as a term of art in English law, to denote verbal or oral proceedings, as distinguished from matters which have been recorded in public tribunals or otherwise reduced to writing. A parol contract is an agreement by word of mouth or simple writing, as opposed to a contract by deed. Parol evidence is the testimony of witnesses given orally, as opposed to records or written instruments. This is the popular acceptation of parol; but, strictly speaking, everything, even in writing, is parol which is not under seal.

PAROS, one of the larger Cyclades, is situated west of Naxos, from which it is separated by a channel 5 or 6 miles wide. Paros is about 36 miles in circumference. The surface is hilly, but it produces corn, abundance of fruit, and has flocks of sheep and herds of swine, and plenty of partridges and other game. The population, according to Thiersch ('État de la Grèce'), is about 4000. The chief town is *Paros*, on the site of the ancient town, on the north-west coast of the island. The principal harbour, which is on the north-east coast, is the best in the Archipelago. The mountain Marpesus, now Capresso, near the centre of the island, contains abundant white marble, which was used by the ancient sculptors. The Greek inscription called the Parian Chronicle was found in this island. Paros belongs to the modern kingdom of Greece. West of Paros, and separated from it by a narrow channel, is the island of Antiparos. [Antiparos.]

PAROTID GLAND (from παρά, 'near,' and οὖς, 'the ear,') is the largest of the three principal glands by which the saliva is secreted and poured into the mouth. The parotid glands are situated, one on each side of the face, behind the ascending part of the lower jaw, and below and in front of the ear. The structure of the parotid is lobulated, being made up of a number of minute cells, the terminations of the branches of the main duct, upon whose walls a net-work of capillary blood-vessels is arranged, and which are collected together in uncertain numbers to form the several

lobules of which the whole gland is made up. The principal disease to which the parotid gland is subject is the mumps. [MUMPS.]

PARR, SAMUEL, was born at Harrow-on-the-Hill, 1747, where his father was a surgeon and apothecary. He received his education at the grammar-school of Harrow. In his fifteenth year he was put to his father's business, but he did not like it, and in his nineteenth year he was sent to Emanuel College, Cambridge, where he applied himself diligently to classical studies. His father dying before his academic course was completed, he was obliged to leave college, and he became, in 1767, one of the masters of Harrow School, where he remained five years. He successively kept a school at Stanmore, Colchester, and Norwich. In 1786, having some time before taken orders, he obtained the small living of Hatton in Warwickshire, where he spent the rest of his life in his parochial duties, and in the instruction of youth. He never had any other preferment, except a stall in St. Paul's. Though a zealous Whig, the Whig party when they came into power did nothing for him.

Parr had considerable talents, and a great deal of learning. He was kind and benevolent, but arrogant and domineering. He died in 1825, leaving behind him a great mass of papers, consisting of his correspondence and other things, which fill eight thick 8vo. volumes, as published by Dr. Johnstone. He left no great work behind him, and his reputation mainly rests on the tradition of his colloquial powers, a reputation however purchased, as such reputations generally are, by disregard of the courtesies of society, and a self-sufficient and overbearing manner. Parr's opinions were often extreme, and he expressed himself in a vigorous and copious manner; but his views on political and social questions did not rise above the mediocrity of partisanship, and have no claim to philosophical depth or originality. His reputation was due to his manner, such as it was, rather than to his matter.

PARRHA'SIUS, son and pupil of Evénor, was a native of Ephesus, but became a citizen of Athens. He raised the art of painting to great perfection. He declared himself to be descended from Apollo, and carried his arrogance so far as to dedicate his own portrait in a temple as Mercury, and thus receive the adoration of the multitude. He wore a purple robe and a golden garland; he carried a staff wound round with tendrils of gold, and his sandals were bound with golden straps. (Ælian, 'Var. Hist.,' ix. 11.) It appears then that Pliny justly terms him the most insolent and most arrogant of artists. ('Hist. Nat.,' xxxv. 10, 36.) The branch of art in which Parrhasius eminently excelled was a beautiful outline, particularly in the extremities.

One of his most celebrated works was his allegorical figure of the Athenian people, or Demos. He painted a Theseus, which, after the general spoliation of Greece, was placed in the Capitol at Rome. He also painted a Hercules, which he maintained was a fac-simile of the god as he had appeared to him in dreams. Pliny enumerates many other works by Parrhasius.

PARROT. [PSITTACIDÆ.]

PARSEES. [PERSIA.]

PARSLEY. The garden parsley is a hardy biennial, a native of Sardinia, introduced into this country about the middle of the 16th century. There are three varieties, two of which are well known, and commonly used as pot-herbs and for garnishing, Common or Plain-Leaved Parsley and Curled Parsley. The Hamburg, or Carrot-Rooted Parsley, is cultivated only for its roots, occasionally used as young carrots. The curled variety is by far the most useful, and from its beautiful curled foliage it cannot be mistaken for the *Æthusa Cynapium*, or Fool's Parsley, a poisonous plant somewhat resembling the Plain-Leaved Parsley.

PARSNEP. The cultivated parsnep (*Pastinaca edulis*) is a native of England, and ranks amongst the hardiest of kitchen-garden productions. There are four varieties, namely, the Common, Guernsey, Hollow-Crowned, and Round or Turnip-Rooted. The Hollow-Crowned has been found the best.

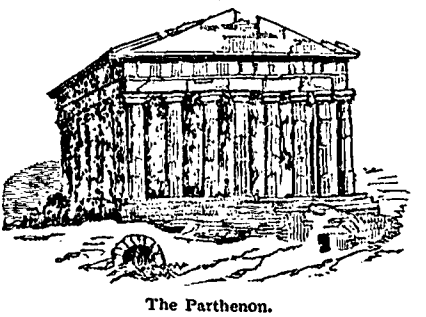
PARSON. [BENEFICE.]

PARSONSTOWN. [KING'S COUNTY.]

PARTHENAY. [SE'VRES, DEUX.]

PARTHE'NIUS, the ancient name of the Bartan or Bartin. This river rises in Mount Olgassys, which is a continuation of the mountain-chain which runs from Mysia towards Armenia, and is known by the names of Ida, Olympus, &c. It flows in a north-westerly direction into the Euxine, and separates Bithynia and Paphlagonia. The country through which it flows is very fertile and beautiful. (*Strabo*, xii. 543; *Tournefort*, vol. ii. p. 88.)

PAR'THENON, the temple of the virgin goddess Athéne, or Minerva, the protectress of Athens, is situated on the Acrópolis of that city.



The Parthenon.

This edifice was erected in the time of Pericles (about B.C. 448). The architects were Callicrates and Ictinus, and the sculptures were executed by Phidias and his assistants. This temple has always been considered the most refined example of the Grecian Doric style, and one of the noblest monuments of antiquity. Yet its grandeur was by no means owing to its extraordinary dimensions, since in point of size it falls far short of many other structures, modern as well as ancient, its extreme length being only 228 feet, and its breadth 100, and the interior of the cella only

145 feet 6 inches by 63 feet 6 inches. Technically described this temple was peripteral octastyle, that is, it had columns along its sides and at both ends, viz. eight beneath each pediment, making in all 46 columns, there being, including those at the angles, 17 on each side, or 16 intercolumns. Besides these external columns, there was likewise a range of inner columns at each end, forming the pronáos and opisthódomus, namely 6, not however placed in antis, as usually, but the extreme columns in front of the antæ extending from the walls of the cella. The cella itself was hypæthral, that is, the central space between the columns along each side was open to the sky. This portion of the structure however was so shattered by an explosion in 1687, when it was used as a powder-magazine by the Turks, at the time of the city being besieged by the Venetians, that its original design is now very much matter of conjecture; besides which the interior of the temple had been more or less injured by having been converted first into a Christian church, and afterwards into a Turkish mosque. Still, even in its present shattered and mangled state, it is the admiration of all travellers and artists who have beheld it. The chief portion of the sculptures of the edifice were removed by Lord Elgin. [ELGIN MARBLES.] One object of art that originally decorated the interior or shrine was the chryselephantine statue of Minerva, 39 feet high, which was the work of Phidias. This figure was ornamented with gold, to the amount of 40 talents according to Thucydides, but according to Philóchorus, 44 talents, or about 120,000*l.* sterling; of which however it was stripped by Láchares, somewhat more than a century and a quarter after the death of Pericles.

Since the establishment of King Otho's government (1833), excavations have been made on the Acropolis and around the Parthenon, and a great number of fragments of sculpture and architecture have been brought to light. Some of the fallen columns have also been replaced, and measures taken to restore the structure as far as circumstances will permit. In the British Museum are two models of the Parthenon, on a large scale, one in its ruinous state, and the other a restoration with the sculptures in their respective situations.

PARTHENOPIANS, an extensive group of the order *Crustacea* (Crabs). This tribe, in the arrangement of M. Milne Edwards, corresponds nearly to the genus *Parthenope* as established by Fabricius, but the species are separated by M. Edwards into the genera *Eumedonus*, *Eurynome*, *Lambrus*, *Parthenope*, and *Cryptopodia*, forming a natural group which, in the opinion of the last-named zoologist, establishes the passage between the *Maiidæ* and the *Cyclometopes*. The Parthenopians are widely distributed, and species are found in the English Channel, the Mediterranean Sea, and the Indian Ocean.

PARTHIA, called by Strabo and Arrian Parthyæa. This term originally comprised a small and mountainous country south-east of the Caspian Sea between Hyrcania and Aria; but the name was sometimes applied to the countries included in the later Parthian Empire. It is difficult to define the boundaries of Parthia Proper, as they differed at various times. In the time of Strabo (xi. 514) Parthia extended on the west as far as Rhagæ and the Tapuri to the Caspian passes, and included the districts of Komisene (Kumis) and Choarene (Khuar). Pliny (vi. 29) says that it was bounded on the east by the Arii, on the south by the Carmanii and Ariani, on the west by the Pratitæ Medi, and on the north by the Hyrcani.

The chief town of Parthia, and the only one in the country of any importance, was Hecatómpylon, which, according to Strabo (xi. 514), was 1260 stadia from the Caspian Gates. Quintus Curtius (vi. 2) says that it was founded by the Greeks; but the name, which is evidently Greek, is probably only a translation of a native word. The site of it is doubtful.

The Parthians were apparently of Scythian origin. They were subject to the Persian monarchy, and formed a satrapy together with the Chorasmii, Sogdi, and Arii. (Herod., iii. 93.) Under Alexander, Parthia and Hyrcania together formed a satrapy (Arrian iii. 22), which also appears to have been the case under the Syrian kings.

On the death of Alexander, the Parthians espoused the side of Eúmenes, and afterwards became subject successively to Antigonus and the Seleúcidæ, till about B.C. 256, when they threw off the authority of the Syrian kings and were formed into an independent kingdom under the rule of Arsaces I., from whom the succeeding kings received the title of Arsacidæ. His reign was the beginning of the great Parthian Empire, which at length extended from the Euphrates to the Indus, and from the Oxus to the Persian Gulf.

The Parthian Empire lasted from B.C. 256 to A.D. 226. Its history may be divided into three periods:—the First Period extends from B.C. 256 to B.C. 130. The Second Period from B.C. 130 to B.C. 53, at the close of which the Parthians came into contact with the Romans. The Third Period extends from B.C. 53 to A.D. 226, and comprehends the wars with the Romans. The last king of Parthia was Artabánus. Artaxerxes, who served in his army and called himself a descendant of the ancient kings of Persia, usurped the dominions of the Parthian kings, and founded the new Persian Empire, usually called that of the Sassanidæ.

PARTICIPLE (in Grammar), the name of one of the parts of speech into which grammarians have distributed the words of a language. The word 'participle' comes from the Latin word 'participium,' and means literally 'part-taking.' Horne Tooke defines a participle to be a 'verb adjective.'

The English language has only two participles, which are usually called present and past. The present participle ends in *ing*, but it originally ended in *and*, which is the same termination as occurs in the cognate languages, namely *ant* in the Sanskrit; *ont* in the Greek, as *σύντ-ον-τ-ος*; *ent* in the Latin, as *reg-ent-is*; and *end* in the German, as *lieb-end*. The other participle in English is used to denote past time, and is generally formed by adding *en* or *ed* or *d* to the verbal

root, which however frequently undergoes a modification, as *brok-en, praise-d.* The final *d* of the participle often becomes a *t*, as *feel, felt.*

PARTICLE, which is derived from a Latin word (*particula*) meaning a small part, is a term employed in grammar. Some of the old grammarians included under this name all the parts of speech except the verb and the noun, namely, prepositions, adverbs, conjunctions, and interjections. But we generally consider such small words as *now, then, indeed,* to be particles. This class of words cannot always be rendered in another language by corresponding single equivalents, and it is necessary to represent their force and meaning by the general form of the sentence.

PARTNERSHIP. If two or more persons join together their money, goods, labour, and skill, or any or all of them, for the purpose of buying and selling, and agree that the gain or loss shall be divided among them, that is a partnership. The object of the partnership may be any thing that is lawful. Any agreement of partnership for an unlawful object is no agreement. The English law of partnership is founded on the common law, the so-called law of merchants, and the Roman law. By the common law a partner has no power to bind his copartner by deed. By the law of merchants he has power to bind his copartner by a bill of exchange, and there is no survivorship in the partnership stock. From the Roman law is derived the principle that a partnership is terminated by the death of a partner, and other fundamental rules. (Gaius, iii. 155.)

No writing is necessary to constitute a partnership. The acts of the parties, when there is no partnership contract in writing, are the evidence of the contract. Partners may be either ostensible, nominal, or dormant. He whose name appears to the world as a partner is an ostensible partner. An ostensible partner may or may not have an interest in the concern; if he has no interest in the concern, but allows his name to appear as one of the firm, he is a nominal partner; if his name and transactions as a partner are purposely concealed from the world, he is a dormant partner. But if his name and transactions are actually unknown to the world, he is more properly termed a secret partner. Generally speaking, any number of persons may be partners, but there are some exceptions.

Any person of sound mind and not under any legal disability may be a partner. An infant may enter into this, as into any other trading contract which may possibly turn out to his advantage. It may however be avoided by him on coming of age, though the person with whom he contracts will be bound. An alien friend may be a trader and sue in personal actions, and may therefore be a partner. Married women are incapacitated from entering into the contract of partnership; and although they are sometimes entitled to shares in banking-houses and other mercantile concerns, yet in these cases their husbands are entitled to such shares, and become partners. If parties share in the profit and loss, they are partners, although one may bring into the trade money, another goods, and a third labour and skill, which was also the rule of the Roman law (Gaius, iii. 149); and where one party is sole owner of goods and another sole disposer or manager of them, if they share the profits, they are partners. Every man who has a share of the profits of a trade must also bear his share of the loss; for a right to a share of the profit implies a liability to bear a share of the loss. Yet one partner may stipulate with the other partners to be free from all liability to loss, and such stipulation will hold good between himself and his partners, which was also the rule of the Roman law, though he will still be liable to all those who have dealt with the firm of which he is a member. Persons who jointly purchase goods are not partners, but tenants in common, unless they are jointly concerned in the profit, or the produce arising from the sale of them. The division of profits between or among partners may be in any proportions that they agree upon. To constitute a man a partner on the ground of sharing profits, he must have an interest in the profits, as a principal in the firm; if he only receive a portion of the profits, by way of payment for his labour, trouble, or skill, as a servant or agent of the concern, he is not a partner. Sometimes there may be a difficulty in determining whether a person is such a sharer in profits, according to the legal meaning of that term, as will make him a partner, and consequently liable to bear his share of any loss.

A partnership at will is one which continues as long as the parties live, and are able and willing to continue it; a partnership for a fixed term continues for the term, if the parties live and are of legal capacity to continue it. A partnership at will may be dissolved at any time by the expressed will of any member of it, a rule which is derived from the Roman law, and which is a necessary consequence of the nature of the partnership contract. The effect of such dissolution is to stop all new partnership dealings or contracts; but the partnership still continues for the purpose of completing all contracts already made, and all dealings or undertakings already commenced. On such dissolution, any partner is entitled to have the whole partnership stock, and the interest in the premises on which the business is carried on, converted into money, and to receive his share of the produce. In all cases, by the natural death of a partner, the partnership is dissolved, a rule also derived from the Roman law, as already stated; it it also dissolved by a partner's civil death, as his outlawry, or attainder for treason or felony; and strictly speaking, the whole property is forfeited to the crown; for the king never becomes joint tenant, or tenant in common with the other partner, and he is entitled to the whole; but this right is seldom enforced against creditors or innocent partners. A marriage of a feme-sole trader is also a dissolution of a partnership at will. A partnership for a term may be dissolved before its expiration by the mutual consent of the parties, by the decree of a court of equity, or by the bankruptcy, outlawry, or felony of any of the partners. A court of equity will in some cases dissolve a partnership on the

ground of incurable insanity in one of the partnership. A partner may agree that upon his death the business may be carried on beyond the legal period of dissolution, in the hands of his children or other third parties, but this is properly an agreement for a new partnership. Partners cannot be relieved from future liabilities to third parties without notice to them and to the world in general that the partnership has ceased; but in the case of a dormant partner, if none of the creditors know that he is a partner, no notice of his retirement from the firm is necessary; and if it be known to some, notice to such only will be sufficient. On the death of a partner, notice of the dissolution to third parties is unnecessary. This is a general description of the nature of partnership. The rules of partnership are very numerous, and belong to a legal treatise.

On partnerships in banks and joint stock companies, see BANK and JOINT STOCK COMPANY. In 1837 a statute was passed (7 Wm. IV. & 1 Vict. c. 73) authorising the crown, after a reference of an application to the Board of Trade, to grant a species of incorporation to trading companies by letters patent under the great seal. The patent may limit the responsibility of partners to a certain sum per share. A partnership for working a mine is considered by courts of equity in England, like any other trade partnership. The mode in which property in ships is held by part owners, is explained in SHIPS.

The fundamental rules of English partnership are the same as those of the Roman contract of partnership, the chief rules of which are contained in Gaius iii., 148–154; 'Dig.' 17, tit. 2. The great extension of English industry and commerce has been accompanied by the growth of a large mass of law applicable to the contract of partnership, a great part of which has been made by the decisions of the courts on such cases as have been litigated. Accordingly the rules about partnership now form the subject of bulky treatises, the safest clue to the use of which is a clear conception of the fundamental notions of a contract of partnership.

PARTRIDGE. [PERDICIDÆ.]

PARUS. [TITMICE.]

PARUTA, PA'OLO, born at Venice, in 1540, of a patrician family, studied in the university of Padua, filled several official stations in the service of his country, and in 1592 was sent ambassador to Pope Clement VIII. at Rome. He was there instrumental in persuading the pontiff to grant absolution to Henri IV. of France, and thus reconciling the latter with the church of Rome. He had previously been appointed historiographer to the republic, in which capacity he continued the history of his country ('Istoria Veneziana'), from 1513, where his predecessor Luigi Contarini had left it, to 1531. Paruta also wrote a separate history of the eventful war of the Venetians against the Turks in the island of Cyprus in 1570–72. His 'Political Discourses,' are a series of disquisitions upon the history of Greece and Rome, as well as upon various passages of modern history. Paruta, after returning from his embassy at Rome, was made a knight and procuratore of St. Mark, and shortly after died at Venice, in 1598.

PAS-DE-CALAIS, a department in France, formed out of almost the whole of Artois and some portions of Lower Picardie, is bounded E. and N.E. by the department of Nord, N.W. and W. by the strait of Dover and the English Channel, and S. by the department of Somme. It extends between 50° 2′ and 51° 0′ N. lat., 1° 33′ and 3° 10′ E. long.; from N.W. to S.E. it is 86 miles long, and its mean breadth is 33 miles. The area is 2531 square miles, and the population in 1846 was 695,756; which gives 274.839 inhabitants to the square mile, being 101.189 above the average per square mile for all France.

The department takes its name from *Passage*, or *Pas-de-Calais*, by which the French sometimes designate the strait of Dover. It consists of two inclined plains, which slope respectively towards the east and west, and lie on either side of a ridge of hills that crosses the department from S.E. to N.W., terminating in the latter direction in the high cliffs of Cape Grinez, between Calais and Boulogne. These cliffs, which extend for some miles on each side of the Cape, are composed of chalk, and bear a close resemblance to those of Dover. In some other parts the coast is low, and defended from the sea by a natural barrier of sandy downs. The coast-line, reckoning all its indentations, has a length of about 80 miles, but it presents no good natural harbours, the inlets being incumbered with sand or the debris of the cliffs. Calais and Boulogne are artificial high-water-harbours formed by piers. Besides the ridge of hills above mentioned, which sends out spurs that form the watersheds between the rivers that flow through the valleys on either slope, there are some isolated high lands S. of Boulogne, and also between the Authie on the southern boundary and the Canche. The principal rivers on the eastern slope are—the Scarpe, the Sensée, and the Lys, feeders of the Escaut; and the Aa, which forms the north-eastern boundary, and falls into the sea at Gravelines; most of these rivers are navigable, or are made so by canalization. From the western slope flow the Lianne and the Canche into the Channel at Boulogne and Etaples respectively, and the Authie, which flows for some way in the department of Somme, and then N.W. into the Channel, forming the boundary between Pas-de-Calais and Somme. By means of its rivers and several canals that connect the principal towns on the eastern slope with those of the department of Nord, Pas-de-Calais has an inland navigation of 124 miles. It is traversed also by the Lille-Calais and the Amiens-Boulogne railroads, both of which are united by the Great North of France line, through Arras, to the great railway systems of France and Belgium. Common highway accommodation is afforded by 13 national and 15 departmental roads.

The soil is in general fertile; farms are large; a very great breadth of land is occupied with the growth of wheat, but other cereal grains, pulse, oleaginous seeds, and cider fruits, are also grown. The low valleys, though generally very fertile and abounding with excellent pastures, are in many places marshy, and in some places covered with peat bogs. Except in the arrondissement of

Béthune, and in the flat districts contiguous to the department of Nord, the fields are mostly uninclosed, and the country, save near hamlets or farmhouses, is bare of trees. A great deal of land is laid out in meadows and orchards. Other crops besides those already named are barley, beet-root for making sugar, hemp, flax, and hops. The number of horses chiefly for draught, of horned cattle, sheep, and swine, is very great; poultry is very abundant, good, and cheap; and fish is very plentiful, great numbers of boats being actively engaged in herring, cod, mackerel, and oyster fishing. The climate resembles that of the south-east of England, but is, if possible, more inconstant, the changes from heat to cold being sometimes marked by great rapidity; the west and north-west winds, charged with sea spray, are sometimes very annoying on the coast.

Iron and coal mines are worked, but not to any very great extent. The ore and coal used in the iron-works are mined on the spot. Other mineral productions are marble, quartz, rock-crystal, limestone, and pipe and potter's clay.

The industrial products of the department are —common woollen cloth, linen, hosiery of all kinds, velveteen, lace, soap, fishing-nets, beet-root sugar, cotton and flaxen yarn, oil, salt, gin, grain and potato spirits, furniture and cabinet work, glass, earthenware, &c. Besides the numerous establishments for the manufacture of these articles, there are also 1578 wind and water mills, several bleach-works, paper-mills, marble-sawing works, tan and fulling mills, and tan-yards. The coasting trade in corn, eggs, butter, seeds, oil, flax, hides, &c., is active. Steam-boats ply regularly between London, Dover, and Folkstone, to Calais and Boulogne.

The forests of this department are small, and chiefly confined to the arrondissements of St.-Omer and Montreuil. Consequently coal is generally used for fuel, and has to be imported from Belgium and the department of Nord; for the quantity of coal raised does little more than suffice for the iron works.

The department contains 1,620,192 acres, distributed among 229,514 proprietors, and into 1,418,020 parcels. Of the whole surface 1,216,726 acres are under cultivation; 114,191 are meadow and grass land; 53,999 are laid out in orchards, nurseries and gardens; 126,999 consist of forests and unproductive woodland; and 54,194 of heaths, marshes, and waters.

The department is divided into 6 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Arras . . .	10	218	171,947
Béthune . .	8	144	136,078
St.-Omer . .	7	136	109,629
St.-Pol . . .	6	193	81,236
Boulogne . .	6	100	117,900
Montreuil . .	6	142	78,966
Total . .	43	933	695,756

Of the arrondissement of Arras and of the whole department, the chief town is ARRAS. *Bapaume*, situated near the source of the Sensée, 15 miles S. by E. from Arras, is a well-built fortified town, with 3210 inhabitants, who manufacture lawn, muslin, calico, thread, soap, and leather. The town has salt-refineries, and is supplied with excellent water from a fountain, which is fed by an artesian well. *Vitry*, on the Paris-Brussels railroad, 10 miles E. of Arras, on the Scarpe, is a village with 2308 inhabitants.

The arrondissement of Béthune takes its name from *Béthune*, a fortified town with a tribunal of first instance, a college, and 7448 inhabitants, situated on a rock above the Brette, 18 miles N. by W. from Arras. The town is pretty well built, and possesses a large square, the centre of which is occupied by an old tower of odd construction. The town-hall, which stands on one side of this square, and the principal church, remarkable for the light elegance of its nave, are the only remarkable buildings. Béthune has a public library; manufactures of soap, oil, lawn, and woollen cloth; salt-refineries, beet-root sugar factories, tan-yards, and a gin distillery. The trade of the town in its industrial products and in corn, wine, brandy, oleaginous seeds, cheese, pottery, &c., is much facilitated by the Lawe and Bassée canals, which here meet in a common basin. The first artesian wells were bored in Béthune and its neighbourhood. *Carvin*, a large village 13 miles E. from Béthune, has, including the commune, 5053 inhabitants, who manufacture flour, beet-root sugar, potato starch, and leather. *La-Venthie* or *Laventie*, N. of Béthune, is a large village with an agricultural population of 4297, who also manufacture linen and leather. *Lens*, an ancient village, 10 miles S.E. from Béthune, has gin distilleries, tan-yards, soaperies, and 2673 inhabitants; it has also some trade in corn, flax, and hemp. *Lillers*, prettily situated in a fertile plain on the Nave, a feeder of the Clémance, is a well-built town with 4879 inhabitants, potteries, bleach-works, breweries, dye-houses, oil-mills, and tan-yards. The town is supplied with water by a great number of fountains.

The arrondissement of St.-Omer takes its name from its chief town St.-Omer. [OMER, ST.] *Aire*, a tolerably well-built town with a college, and 9591 inhabitants, is situated 9 miles S. by E. from St.-Omer, at the confluence of the Laquette with the Lys, and at the junction of the St.-Omer and Bassée canals, by means of which it communicates with the Aa and the Deule. The town is surrounded with ramparts and deep ditches; it has barracks large enough to accommodate 6000 men; a town-house; several handsome fountains; and two fine churches. Hats, soap, oil, basket-work, grain spirits, glazed paving tiles, &c., are manufactured. *Ardres* is a small fortified town with 2193 inhabitants, 17 miles by railway N.W. from St.-Omer, and 7½ miles S. by E. from Calais. A regiment of cavalry lies in the town; the barracks, stables, and riding-house are the most note-worthy objects. *Le Champ du Drap d'Or*, or The Field of the Cloth of Gold, lies between this town and Guines. *Au-*

drwick, 11 miles N.N.W. from St.Omer, has 2299 inhabitants.

In the arrondissement of St.-Pol the chief town, *St.-Pol*, is situated 20 miles N.W. from Arras at the intersection of seven high roads, and at the head of a vale watered by the Ternoise, a feeder of the Canche. This town was formerly the capital of the county of St.-Pol, and was fortified: of its defences and of the castle of the counts of St.-Pol there are still some remains. It is an irregularly-built place; and has a college and 3374 inhabitants. *Auxy-le-Château*, situated in a marshy district on the Authie, 16 miles W. from St.-Pol, has several tan-yards, and 2673 inhabitants.

Of the arrondissement of Boulogne the chief town is BOULOGNE. The other towns are CALAIS: *Desvres*, which is situated 9 miles S.E. from Boulogne, in a well-watered district, near a large forest, and has 2808 inhabitants, who manufacture coarse woollens, pottery, tobacco pipes, and leather. *Guines*, which stands in a marshy country, 5 miles S. from Calais, and on the canal from St.-Omer to Calais, has 4097 inhabitants, who trade in corn, linen, cattle, poultry, fire-wood, turf, and charcoal, and who manufacture tulle, pottery, leather, salt, &c.: *Marquise*, which is situated 8 miles N.E. from Boulogne, on the road to Calais, on the Slack, and has 2108 inhabitants: and *Samer*, which is built on a hill 8 miles S.E. from Boulogne, on the high road to Montreuil, and has a population of 2195. Samer is famous for the remains of an abbey founded about the middle of the 7th century.

The arrondissement of Montreuil is named from its chief town *Montreuil-sur-Mer*, which is situated 25 miles by railway S. from Boulogne, on a high hill near the right bank, and about 4 miles from the mouth, of the Canche. It is tolerably well built with bricks, and strongly fortified. The town has a tribunal of first instance, a college, and 4215 inhabitants, who manufacture soap, salt, paper, beer, and leather. The tower of the citadel was the prison residence of Queen Bertha, the repudiated wife of Philippe I. Montreuil was ceded to the English by the treaty of Bretigny, but it soon shook off their yoke; in 1537 it was taken by Charles V.; the Spaniards took it a second time in 1544. The charter of the town dates from the year 1189. *Etaples*, a small sea-port town, is situated on the northern shore of the mouth of the Canche, which here forms a small bay, 18 miles by railway S. from Boulogne. The town is said by some to occupy the site of the *Portus-Itius* of Julius Cæsar. Here a treaty of peace between Henry VII. and Charles VIII. was concluded in 1492. Étaples was formerly a place of much greater importance than now, when it numbers scarcely 2000 inhabitants, chiefly fishermen. *Fruges*, situated on a steep hill 18 miles E. from Montreuil, consists of several streets, which abut on a large square. It has 2952 inhabitants, who manufacture woollen cloth, hosiery, tobacco pipes, salt, and leather. *Hesdin*, one of the prettiest towns in the department, is beautifully situated in the rich valley of the Canche, 15 miles S.E. from Montreuil, and has 3790 inhabitants. The town is well built with bricks; it is surrounded by ramparts and by ditches, which are always filled by the waters of the Canche. In the town-hall, a graceful structure, there is a small public library. The environs of this town are well cultivated and exceedingly pretty. Hesdin has manufactures of hosiery, oil, pottery, bricks, cotton yarn, salt, and leather.

The department forms the see of the bishop of Arras, who is the sole suffragan of the Archbishop of Cambrai. It is included in the jurisdiction of the High Court and of the University Academy of Douai: and belongs to the 16th Military Division, of which Lille is head quarters. Under the late monarchy it returned 8 members to the Chamber of Deputies; it now has 15 representatives in the Legislative Assembly of the Republic. (*Dictionnaire de la France; Annuaire pour l'An* 1849.)

PASA'RGADÆ (sometimes written *Passargadæ*, and also, but only by Ptolemæus and Solinus, *Pasargada*), an ancient town of Persia, which is said to have been built by Cyrus after his victory over Astyages the Mede, which he gained near this place. The kings of Persia, according to Plutarch, were consecrated at Pasargadæ by the Magi, and here was the tomb of Cyrus, of which Strabo (xv. 730) and Arrian (vi. 30) have given a description taken from the work of Aristobúlus, who had visited the spot. Pasargadæ and Persepolis were not the same place, as some writers have supposed, but the position of Pasargadæ is doubtful. Morier ('Journey into Persia,' p. 144) and R. K. Porter ('Travels,' i. 498) place it in the plain of Murghab, about 50 miles N.E. of Persepolis, where they discovered a building which seems to correspond in many respects to that described by Arrian. The natives call it the Tomb of the Mother of Solomon. Lassen thinks that Pasargadæ was in the neighbourhood of Darabgherd or Fasa. Herodotus (i. 125) merely mentions the name of the Pasagardæ as one of the noblest Persian tribes.

PASCAL, BLAISE, was born at Clermont in Auvergne, June 9, 1623. He was the only son of Etienne Pascal, président of the Court of Aids in that province, himself a learned and respectable man and able mathematician, who, when his boy had reached his 8th year, resigned his office and removed to Paris, for the purpose of watching over his education. At sixteen years of age Pascal produced a treatise on the conic sections, of such excellence as to provoke the incredulity and wonder of Des Cartes. In his 19th year he invented an ingenious machine for making arithmetical calculations; and when he was 24 years of age the conjecture of Torricelli, that the atmosphere had weight, and that this quality might account for effects before ascribed to the horror of a vacuum, led him to institute many experiments on this subject, which confirmed the truth of Torricelli's idea, and established his own scientific reputation. The results of these labours were collected into two essays, which appeared after his death, 'On the Equilibrium of Liquids,' and 'On the Weight of the Atmosphere.' From these researches the

mind of Pascal was diverted entirely to objects of religious contemplation; and thenceforward he abandoned almost entirely the pursuits of science. While immersed in the most rigid religious and even superstitious observances, he published his celebrated Provincial Letters, in which, under the name of Louis de Montalto, he assailed the morality of the Jesuits with equal wit and argumentative acumen. He was induced to write this work by his adoption of the opinions of the Jansenists, which involved him in the religious disputes of his age and country. Among the fruits of his devotional exercises may also be named his 'Pensées.' Pascal died at Paris, in 1662, at the age of 39.

PASCHAL I. [POPE.]

PASCHAL II., *Ranieri of Bleda* in Tuscany, was a monk of the order of Cluni. Having been sent to Rome about the affairs of his monastery, he was noticed by Pope Gregory VII., who made him a cardinal. After Gregory's death and the short pontificate of Urban II., Paschal was elected pope. He refused the dignity, but was at last prevailed upon to accept the papal chair, 1099. He prosecuted the great contest about the investitures, begun by Gregory VII. with the emperor Henry IV., against whom he launched a fresh bull of excommunication. Henry's son and namesake, availing himself of this, revolted against his father, and, having deposed him, was acknowledged as king of the Germans by the title of Henry V. Paschal now proposed a compromise, but is said to have been prevented from carrying it out by the bishops; at any rate he refused to crown the new emperor, who marched to Rome and took the pope prisoner. Paschal remained for nearly two months in a state of confinement, until at last he consented to consecrate Henry unconditionally, giving up by a bull the right of investiture to the emperor. After the ceremony, Henry returned to Germany, and Paschal assembled a council in the Lateran, by which his session of the right of investiture was solemnly condemned. Several of the turbulent German feudatories now revolted against Henry, who, however, defeated his revolted subjects, and marched again to Italy to terminate the question with the see of Rome. Paschal escaped, and Henry caused himself to be crowned again by the bishop of Benevento. After his departure, Paschal returned to Rome, but soon fell ill of fatigue and anxiety, and died in Jan. 1118. He was succeeded by Gelasius II.

PA'SHA or BASHA, a Turkish appellation for a man in high command, such as the great officers of the Porte, the governors of provinces, and the high admiral, who is called Capudan Pasha. The provinces administered by Pashas are called Pashaliks.

PA'SPALUM, so called from one of the Greek names for Millet, is a genus of grasses, which, like some species of *Panicum*, forms one of the small grains cultivated in tropical countries as food for the poorer classes of the community. *P. scrobiculatum* is cultivated by the natives over almost all parts of India. The seed is an article of diet with the Hindoos, particularly with those who inhabit the mountainous parts. Dr. Roxburgh states that the boiled grain is as palatable as rice.

PASQUE FLOWER, or *Paschal Flower*, so named in consequence of its usually flowering about Easter, is the *Anemone pulsatilla* of botanists.

PASQUIE'R, ETIENNE, born at Paris in 1529, studied the law, and in 1564, when the great suit between the Jesuits and the University was brought before the parliament of Paris, Pasquier was entrusted with the management of the cause on behalf of the university. He made a brilliant speech, which was printed and translated into various languages, and established his reputation. In 1585 Henri III. made Pasquier advocate-general to the Chambre des Comptes. In 1588 he was named deputy to the states-general of Blois, and there he witnessed the murder of the Duke of Guise, which he relates impartially in his letters. When Henri III. was obliged to leave Paris in possession of the League, Pasquier followed him to Tours. His sons were at that time fighting in the king's army, and one of them was killed. After the surrender of Paris to Henri IV., in 1594, Pasquier continued in his office of advocate-general, till 1603, when he resigned, and died at Paris, in 1615. His works were published in two volumes, fol., Œuvres d'Etienne Pasquier,' Amsterdam, 1723. They consist of his 'Recherches sur la France,' which is an interesting work, and of his 'Lettres.'

PASQUIN, the name given to a mutilated ancient statue which stood at the corner of the palace Santobuono, in the city of Rome. Pasquino was the name of a tailor who lived in that neighbourhood 'many years since,' says Parisio, in his 'Antiquities of Rome,' published in 1600. The tailor was a facetious man, and his witty sayings were styled 'Pasquinate,' which afterwards became a common appellation for humorous epigrams and sarcastic lampoons, a kind of composition for which the modern Romans are noted. These lampoons, which often attacked people in high stations and the government itself, were fixed in the night on or near the statue already mentioned; and thus the statue itself came to be called Pasquino, as being the representative of the witty tailor of that name. Collections of these epigrams have been made, and some of them are very witty, though often scurrilous and coarse.

PASSAGES. [BASQUE PROVINCES.]

PASSAU, the capital of the Bavarian circle of the Lower Danube, is situated at the point where the Danube is joined by the Ilz and the Inn, in 48° 36′ N. lat., 13° 25′ E. long., and has 10,820 inhabitants. It consists of the town itself, and three suburbs. A handsome bridge, resting on seven piers of granite, crosses the Danube, which is 754 feet wide. On the right bank of the Inn, which is 800 feet wide, is the suburb called the Innstadt, connected with the town by a wooden bridge. On the other side of the Danube, and on the left bank of the Ilz, lies the Ilzstadt. The third suburb is called the Anger. In the angle between the right bank of the Ilz and the Danube there is a rock 400 feet high, upon which stands the fortress of Oberhaus, which is connected with

the castle of *Niederhaus*, situated below. The town of Passau itself is pretty well built; among the public buildings the most remarkable are the bishop's palace, the lyceum, the cathedral, the church of St.-Michael, a gymnasium, the ecclesiastical college, and the post office, in which the treaty of Passau was signed in 1552. In the Domplatz, the handsomest square in the town, stands the colossal bronze statue of King Maximilian Joseph, erected in 1828. The charitable institutions of Passau possess a capital of two million florins. There are a great tobacco and snuff manufactory, extensive breweries, tanneries, and paper-mills. Passau is the staple town of Bavaria for salt; there are great magazines, to which the salt is brought from the works at Hallein. Steamers ply on the Danube to Regensburg or Ratisbon, Linz, and Vienna.

PA'SSERI, GIOVA'NNI BATTISTA, born at Rome about 1610, and was first engaged as painter in 1635 by Canini in the Villa Aldobrandini at Frascati. At the close of his life he entered into holy orders; and obtained in 1675 a benefice in the college of Santa Maria in Via Lata. He died in 1679. Passeri is one of the best of the Italian historians of art. He left behind him a work containing 36 lives of eminent men, which was not published until 1772. It is entitled 'Vite de' Pittori, Scultori, ed Architetti che anno lavorato in Roma, morti dal 1641 fino al 1673, di Giambattista Passeri, Pittore e Poeta,' 4to. There is only one public picture by Passeri in Rome, a crucifixion between two saints, in the church of San Giovanni della Malva. They are not so rare in galleries. He painted sometimes still-life. His nephew Guiseppe Passeri, who was likewise a painter, died in 1714, aged 60.

PASSERO'NI, GIAN CARLO, born in 1713, at Condamine, in the county of Nizza, studied at Milan in the Jesuits' college, and afterwards took orders as a priest. He went to Rome with the papal nuncio, and afterwards returned to Milan, where he spent the rest of his life in a state of poverty often bordering upon destitution. Passeroni was fond of study, and especially of poetry, and he had a great share in reforming the taste of the Italian writers of his age. His principal work is a half burlesque half moral poem, styled 'Il Cicerone,' in 101 cantos. Passeroni also wrote fables in verse, 'Favole Esopiane,' chiefly imitations of those of Æsop, Phædrus, and Avienus, 6 vols. 12mo. He died at Milan, Dec. 26, 1802.

PASSIFLORA, or *Passion Flower*, is a genus of twining plants, the name of which is derived from a fancied resemblance between the parts of the flower and the emblems of our Saviour's crucifixion. In the five anthers the Spanish monks saw his wounds, in the triple style the three nails by which he was fixed to the cross, and in the column on which the ovary is elevated, the pillar to which he was bound; a number of fleshy threads which spread from a cup within the flower were finally likened to the crown of thorns.

The genus comprehends a large number of species, chiefly found in a wild state in America, and within or near the tropical parts of that continent. They are all twining plants, often scrambling over trees to a considerable length, and in many cases are most beautiful objects on account of their large gaily or richly coloured flowers. This makes them favourites in gardens, where many are cultivated, particularly the *P. alata, quadrangularis, edulis, cærulea, racemosa, Lowdoni, onychina, palmata,* and *filamentosa*, all which are strikingly handsome. It is however chiefly for their fruit that they are valued in the countries where they grow wild, in consequence of the pulp which envelopes the seeds being cool and refreshing, with something of a fragrant bouquet. Under the name of Granadilla the *P. quadrangularis* is well known in Brazil, where its fruit is as large as a child's head; the Water-Lemon of the West Indies is the produce of *P. laurifolia; P. maliformis* bears what is called the Sweet Calabash; and the pleasant pulp of *P. edulis* furnishes the confectioner with the most delicate material for the flavouring of ices. Many however are of no value for their fruit, and some are actually fœtid.

The Passion Flower serves as the type of the natural order *Passifloraceæ*, of which indeed it constitutes the principal part.

PASSIGNA'NO, DOME'NICO DA, or *Domenico Cresti*, was born at Florence about the middle of the 16th century. He was the pupil of Federigo Zucchero, and lived some time in Venice, where he became attached to the Venetian school of painting. He acquired a great reputation at Rome, and was employed by the popes Paul V. and Urban VIII. He painted the Crucifixion of St. Peter for the Capella Clementina in the great church of St. Peter in the Vatican, for which he was created Cavaliere dell' Abito di Cristo. He spent the latter part of his life at Florence, and he was one of the most influential of those painters who contributed towards the reform of the Florentine School. He died in 1638.

PASSOVER, also called the Feast of Unleavened Bread, one of the three great annual festivals of the Jews, was established to commemorate God's passing over the houses of the Israelites in Egypt when he slew the first-born of the Egyptians. (Exod. xii. 27.) During the seven days for which the feast lasted none but unleavened bread was to be eaten, on penalty of being cut off from the people. Sacrifices were appointed to be offered on each of the seven days. (Numb. xxviii. 17-25).

PASSPORT, a printed permission signed by the secretary of state of the home department of a country, which allows a subject of that country to leave it and go abroad. When he has obtained this, the bearer must have his passport signed by the minister or agent of the state to which he intends to proceed. A foreigner who wishes to leave a country where he has been residing, generally obtains his passport from the minister or agent or consul of his own state. Such a document states the name, surname, age, and profession of the bearer, describes his person, and serves as a voucher of his character and nation, and entitles him to the protection of the authorities of other

countries through which he may pass, and which are at peace with his own. On arriving at the outports or frontier towns of a foreign state, every traveller is obliged to show his passport, which is examined by the proper authorities before he is allowed to proceed on his journey. This ceremony is sometimes repeated at every garrison town which he passes on the road. Even the natives of most European states cannot travel twenty miles through their own country without being furnished with a passport.

The system of passports is old, but it has become much more rigid and vexatious during the last half-century. Passports are not required in the British Islands and the United States of North America; and the natives of those two countries, accustomed to the freedom of unobstructed movement, find the regulations as to passports, when they travel on the continent of Europe, to be very irksome.

PASTE. [GLASS.]

PASTINA'CA, a genus of plants belonging to the natural order *Umbelliferæ*. *P. sativa*, Parsnep, is native of Great Britain and of Europe, even to the Caucasus, on hillocks and dry banks, in a chalky soil. The root is spindle-shaped, white, aromatic, mucilaginous, and has a sweet taste. A variety of this species, *P. edulis*, is the common edible parsnep.

PA'STORAL (from the Latin *pastor*, a shepherd or herdsman), is the name given to poems which are descriptive of the pursuits of country life, or to dramas in which the characters represent shepherds or other country-people. [BUCOLICS; IDYLL.]

Pastoral Letters are circulars addressed by a bishop to his diocesans for purposes of religious instruction or admonition in matters of discipline. This name also is derived from 'pastor,' the bishop being considered the shepherd of his spiritual flock.

PASTURE LAND. The pasturage of cattle is now a part of regular husbandry. The land which affords the herbage for cattle forms part of private possessions, and a rent is paid for its use. Pastures are now fenced and protected, and pains are taken to improve them, so as to maintain many more cattle or sheep than they would in their natural state. We shall not here speak of rich grass lands, in which bullocks and sheep are fatted, and which are commonly called grazing land; nor of artificial pastures, which form portions of arable farms, and have been depastured only to enrich them and make them more fit to produce corn when again submitted to the plough. But we shall consider those tracts of land which, from situation, climate, or other causes, although they are portions of certain estates and the property of individuals, lie nearly in a state of nature, and produce a revenue or profit only according to the number of cattle and sheep which can be reared or maintained in them. Such are the rich pastures on the Jura, the Alps, and the Pyrenees, too high and exposed to allow of cultivation or permanent habitation, but producing abundant food for cattle in particular seasons of the year.

Whenever pastures are hired, the rent is always reckoned, not by the extent of surface, but by the stock which can be maintained upon it. Thus, in Switzerland, the mountain pastures are divided into portions of twenty, forty, or more cows. In Scotland they reckon sometimes by the number of bullocks which can be reared, and sometimes by the number of sheep which can be kept. In many places pasturing has been found much more productive than cultivation; and some large proprietors have converted great tracts of land from arable into pasture farm. But this can only be done where the population is very scanty, and where the soil and climate do not tempt men of capital to settle.

Wherever there are large pastures in exposed situations, proper and suitable buildings made of substantial materials should be erected. The cattle should have numerous sheds for refuge in bad weather, and sheep especially should have protection and shelter. Warmth is in some cases of more importance than food; and an animal exposed to all the severities of a northern climate requires more food to keep him alive than when he is kept warm and protected from the immediate influence of cutting winds.

There is another kind of pasture in England on the chalky hills which are called Downs, where useful and hardy sheep are reared. Here the exposure is less, and the proximity to the plains gives frequent opportunity of driving the sheep to sheltered situations. The grass on the chalk hills is in general very fine and short, and the quality is very good.

To those who have extensive pastures it is of great consequence to ascertain whether oxen, heifers, cows, or sheep, are the most profitable, and of these, what breeds suit the situations; and, when this has been determined by experience, to know what quantity may safely be kept, without suffering for want of sufficient food, or allowing any portion of the pasture to wither or become coarse from not being duly fed off. Whatever be the stock depastured, the greatest attention should be paid to them by a herdsman or shepherd of experience, who should have a certain number only under his care. It is a good plan to give him some share or interest in the produce as part of his wages.

Pastures are seldom improved with manure, which is generally reserved for arable land, or grass land intended to be mown for hay: but if richness is valuable in a pasture, it will well repay the expense of manuring, especially with liquid manure, the drainings of dunghills and the urine of cows and horses, which is collected in a tank when they are kept in stalls.

PATAGONIA, a country in South America, comprehending the most southern portion of that continent. It extends from 38° 50′ to 53° 35′ S. lat.; and is bounded on the east by the Atlantic, and on the west by the Pacific. According to a rough estimate the area of Patagonia exceeds 276,000 square miles.

Patagonia comprehends two regions, which differ from one another in nearly every respect —the mountain-region, and the plains. The mountain-region occupies the countries extend-

ing along the shores of the Pacific and the western portion of the Strait of Magalhaens. The plains occupy the eastern part of the country, stretching out along the Atlantic and the eastern part of the Strait of Magalhaens.

The mountain-region comprehends the southern portion of the Andes. It is cut through by two long but comparatively narrow inlets, which extend to the plains east of the mountains, and there expand into large salt-water lakes. The southern of these lakes, or inland seas, may be compared in shape to the Mediterranean; it consists of two parts, Otway Water and Skyring Water, which are connected with each other and with the Pacific by Jerome Channel and Fitzroy Passage. Otway Water is 50 miles in length, and Skyring Water 80 miles. The northern inland sea in form bears some resemblance to the Baltic. It extends 30 miles in length, with two inlets, each 30 miles long; and it is connected with the sea by Smyth's Channel. These inland waters cut up the mountain region into three portions; of which the southern is called Brunswick Peninsula, a barren hilly district, with scarcely any rivers; the central, called Ponsonby Land, which is mountainous almost close to the Pacific, and declines gradually towards the east; and the northern, comprising the mountainous portion of Patagonia up to Chile. Here the Andes are seen very near the coast, and rising to heights varying from 4000 to 8000 feet. But the open sea of the Pacific does not wash this rocky coast. A series of high and rocky islands lie like a barrier in front of it, so that no part of the continent, except the peninsula of Tres Montes, is exposed to the ocean's swell. Some of these islands are of great extent; others are only separated from one another by narrow straits, which are not visible at some distance from the open ocean, and the islands accordingly appear to be a continuous high rocky shore. Among these islands are Chiloe, the Chonos Archipelago, Guaianeco Islands, Wellington Island, Archipelago of Madre de Dios, Hanover Island, Queen Adelaide's Archipelago, and South Desolation Island. In the mountain region of Patagonia the air is damp and chilly. There are large forests of timber trees; but neither the animal nor vegetable products of the country are abundant.

The plains of Patagonia, which form the eastern division, and occupy the greater portion of the country, extend along the Atlantic Ocean. The plains, though similar in aspect, seem nevertheless to differ in their natural capacities. Between 47° and 48° S. lat., the coast forms a wide promontory, projecting near 100 miles from the body of the mainland. South of 49° S. lat. to the northern shores of the Strait of Magalhaens, the coast presents an aspect similar to that of the county of Kent in England, but instead of chalk, the cliffs are composed of soft marly clay, without any gravel or impressions of organic remains. These cliffs form the descent of an elevated plain, which extends several miles westward, and is then followed by an escarpment of from 100 to 150 feet elevation, which constitutes the slope of another and more elevated plain. Thus the country extends from east to west in wide plains, which rise one above the other like terraces. About 100 miles from the shores, the plains seem to attain an elevation of near 1000 feet. The plains are traversed from west to east by the Santa Cruz River, whose mouth is near 50° S. lat. The country north of 45° S. lat. differs from the southern plains. The shores are fronted by rocky reefs extending from 2 to 3 miles from high-water mark, which are dry at low tides, and in many places covered with seals. The beach is rather steep, and consists of shingle. Above it extends an undulating country, which at some distance rises into hills. It is watered by the river Chupat. The climate of the plains is drier and warmer than that of the mountain region; and the zoology and botany are very different.

The inhabitants of the mountain region are different from those of the plains. The natives of the plains are called Patagonians, or Horse-Indians, as they wander about in the interior on horseback. The natives of the mountain-region are called Canoe-Indians, because they live only on the sea-coast, and frequently remove from one inlet to another in canoes. The Patagonians have for three centuries had the reputation of being a race of giants; but Captain Fitzroy met with very few who exceeded six feet and a few inches in height; although on the other hand few were less than five feet nine inches. A large mantle made of skins sewed together, loosely gathered about their bodies and hanging from the shoulders to the ankles, adds so much to their apparent magnitude, that one can hardly be persuaded that they are only a few inches above six feet, till they are actually measured. The Patagonians wander about in the extensive plains south of the Rio Negro, and traverse that immense distance (800 miles) in a comparatively short time. Their principal subsistence is the flesh of mares, emus, cavias, and guanacoes. They broil their meat. Their huts are in shape not unlike gipsy-tents. They consist of poles stuck in the ground, to which others are fastened; the whole is covered with skins sewn together, except towards the east, where they are open.

PATAY. [LOIRET.]

PATEL, PIERRE, was born in 1654, and was killed in a duel in 1703. He was a native of France and a painter, but neither the place of his birth nor the master under whom he studied is known. His works are much admired. He seems to have confined himself to landscape-painting. He appears to have taken Claude Lorraine for his model. His touch is light and firm, and his colouring clear and natural. His figures are superior to those of Claude. He had a son, *Pierre Patel*, who was also a landscape painter.

PATELLOI'DEA, a genus of *Mollusca* proposed by MM. Quoy and Gaimard for certain *Gasteropoda*, which have shells exactly resembling those of limpets, but whose animals are cervicobranchiate. It is synonymous with the genus *Lottia* of J. E. Gray. The *Patella testudinalis* of Otho Fabricius, a shell not uncommon on the northern coasts of Britain, is the type. Numerous

species are known, inhabiting all latitudes, and living in various depths of water. Their shells are gaily coloured, often tessellated and rayed with purple, orange, or pink. The animals are usually of a uniform tint of white, orange, or pale red.

PATENT. This term is applied to certain privileges which are granted by the crown by letters patent. [LETTERS PATENT.] The object of such privileges is to encourage useful inventions. Before applying for a patent for an invention, two considerations are necessary: first, what is entitled to a patent; and next, whether the invention has the requisite conditions.

In the first place, the machine, operation, or substance produced, for which a patent is solicited, must be new to public use, either the original invention of the patentee, or imported by him and first made public here. A patent may be obtained for England, Ireland, or Scotland, although the subject of it may have been publicly known and in use in either or in both of the other two countries.

In the second place, the subject of the invention must be useful to the public, something applicable to the production of a vendible article, for this is the construction put upon the words 'new manufacture' in the statute of James I. The discovery of a philosophical principle is not entitled to such protection: such principle must be applied, and the manner of such application is a fit subject for a patent.

Inventions entitled to patent may be briefly enumerated as follows:—

1. 'A new combination of mechanical parts, whereby a new machine is produced, although each of the parts separately be old and well known.

2. 'An improvement on any machine, whereby such machine is rendered capable of performing better or more beneficially.

3. 'When the vendible substance is the thing produced either by chemical or other processes, such as medicines or fabrics.

4. 'Where an old substance is improved by some new working, the means of producing the improvement is in most cases patentable.'

If the inventor think that the machine, operation, or substance produced comes under any of these enumerations, and that it is new, and likely to be useful to the public, he must proceed in the form required by law to obtain the letters patent.

The 1st part of the letters patent recites the petition and declaration, and sets forth the title which has been given to the invention by the inventor.

The 2nd relates to the granting the sole use of the invention to the inventor for the space of fourteen years, whereby all other persons are restrained from using the invention without a licence in writing first had and obtained from the patentee, and persons are restricted from counterfeiting or imitating the invention, or making any addition thereunto or subtraction therefrom, with intent to make themselves appear the inventors thereof. This clause also directs all justices of the peace and other officers not to interfere with the inventor in the performance of his invention.

The 3rd part declares that the patent shall be void, if contrary to law or prejudicial and inconvenient to the public in general, or not the invention of the patentee, or not first introduced by him into this country.

The 4th declares that letters patent shall not give privilege to the patentee to use an invention for which patent has been obtained by another.

The 5th relates to the manner in which letters patent become void, if divided into more than a certain number of shares. The number of such shares used to be five, but all patents sealed since May, 1832, allow the interest to be divided between twelve persons or their representatives. This part also relates to the granting of licences.

The 6th contains a proviso that a full and accurate description or specification shall be enrolled by the patentee in a specified time.

The 7th directs the patent to be construed in the most favourable manner for the inventor, and provides against inadvertency on the part of the clerk of the crown in enrolling the privy seal bill.

Letters patent then only grant the sole use of an invention for a certain time, provided that the statement in the declaration be true, that the title give a distinct idea of the invention, and that the specification be enrolled within a certain time mentioned in the patent, generally two months for England, four for England and Scotland, and six for the three countries together. This time depends on the attorney or solicitor general, a longer or shorter period being granted according to the extent or difficulty of the invention; in some instances two years have been allowed for specifying.

The object of the specification is two-fold:—

First, it must show exactly in what the invention consists for which a patent has been granted, and it must give a detailed account of the manner of effecting the object set forth in the title. It must describe exactly what is new and what is old, and must claim exclusive right to the former. The introduction of any part that is old, or the omission of any part that is new, equally vitiates the patent.

In the second place, a patent is granted for a certain number of years on the condition that such full and accurate information shall be given in the specification as will enable any workman or other qualified person to make or produce the object of the patent at the expiration of that term without any further instructions.

If a patentee finds that the time allowed him by the patent is not sufficient to remunerate him for the trouble and expense of his invention and patent, he may apply for an extension of the term. This used to require a petition to parliament, but by the 5 & 6 Wm. IV. c. 83, the patentee, after advertising his intention to apply for an extension of his patent in the manner required by the act, may petition the king in council. Any person wishing to oppose the extension must enter a caveat at the Privy Council Office, and the petitioner and enterer of the caveat or caveats are heard by their counsel before the Judicial Committee, which reports to the king; and the king is authorised, if he shall think fit, to grant new letters patent for the same invention for a term not exceeding seven years after the expiration of

the first term. The application must be made so as to allow time for the grant before the conclusion of the original term; according to 5 & 6 Wm. IV. c. 83; but this condition is somewhat modified by 2 & 3 Vict. c. 67. By the 7 & 8 Vict. c. 69, s. 2, a patentee may obtain an extension of the term for any time not exceeding fourteen years, 'subject to the same rules as the extension for a term not exceeding seven years is now granted under the powers of the said act of the sixth year of the reign of his late majesty.' (5 & 6 Wm. IV. c. 83.) This act contains also other enactments applicable to the extension of time where patentees have wholly or in part assigned their right.

Scotch and Irish patents are obtained by a process similar to that described for England; the applications however are made to the respective law officers of each country.

The time necessary for obtaining a patent is seldom less than two months, and frequently much longer. The expense also is very heavy, and may be stated on an average at 120*l.* for England, with 5*l.* additional for the colonies, 100*l.* for Scotland, and 125*l.* for Ireland. (See COPYRIGHT; and T. Turner, *On Copyright in Designs in Art and Manufactures*, 1849.)

PATENTS. (Law.) The law relating to patents for inventions is founded on the 21 James I., c. 3., to which reference is made in the article MONOPOLY, and on the cases decided under that statute. It is also somewhat modified by the 5 & 6 Wm. IV., c. 83, and 2 & 3 Vict., c. 67, and 7 & 8 Vict., c. 69.

The grant of a patent is the free gift of the crown. The form of the grant is by letters patent, which, being the deed of the crown, are considered as of public record. The power acquired by the grant of a patent consists in the sole right of making a certain material thing, or of putting together material things in certain specified proportions or forms, in order to produce some definite result; and it also consists in the sole right of selling or allowing to others the use of such material thing or the means of producing such definite result. The grant of a patent endures for 14 years from the date of the first letters patent, or for such other time under 14 years as the grant may contain. A patent cannot be held in any way so that more than twelve persons shall be interested in it. With the exception above mentioned, a patent is in all other respects like personal property, and of course may be sold or disposed of by will. The patentee may also grant licences to other persons to use his patent.

If the patent is infringed, the patentee or his assignee may bring his action for damages against the offender. The patentee or his assignee may also file a bill in equity against the infringers of the patent, and this is generally the best method of proceeding. On a bill being filed, immediately on the discovery of the infringement, which states a proper case and is supported by affidavits, an injunction may be obtained restraining the defendant from violating the patent until he puts in his answer or until further order of the court. The defendant may move to dissolve such injunction upon filing his affidavits, or he may make such motion on putting in his answer. When an injunction cannot be obtained either before the answer or upon the answer, and there is a doubt about the validity of the patent right or the infringement of it, the court will generally direct the defendant to keep an account of the proceeds of his manufacture, and will also either direct an issue to try the facts of validity or infringement, or leave the patentee to bring his action. If the patentee can establish the validity of his patent in a court of law, the court of equity will then grant an injunction against its infringement.

There is a further advantage in applying to a court of equity in the case of an infringement of a patent; the court can direct the trial at law in such manner as it thinks just, and can order parties to be examined on the trial who would not otherwise be competent witnesses; and when the alleged fact of infringement is done secretly, it can order the manufactory or workshop to be inspected. [LETTERS PATENT; PATENT.]

PATERA, an open vessel approaching to the form of a cup, used by the Romans in their sacrifices, in which they received the blood of the victims, and with which they made libations.

PATE'RCULUS, VELLE'IUS, was born about 19 B.C. He served in the army under Augustus, was made military tribune, and accompanied Tiberius in his German and Illyrian campaigns. He wrote a sketch of Roman History, which he dedicated to the Consul Vinicius or Vinutius Quartinus, A.D. 30, the year before the proscription of Sejanus. Paterculus is supposed to have lost his life at the time when Sejanus suffered, who was a patron of his. The 'Historiæ Romanæ' of Paterculus consist of two books. The second book is complete, and the matter is treated with some fulness. It treats of the times of the Gracchi, and the periods which followed to the end of the reign of Augustus. It concludes with a panegyric on Tiberius and Sejanus. The language of Paterculus is easy and flowing. The Bipont edition, 1780, with Dodwell's 'Annales Velleiani' is useful.

PATHOLOGY (from *πάθος*, disease, and *λόγος*, a discourse) is the science of diseases, and especially of those which affect men and animals which are the subjects of medical treatment.

For the perfect knowledge of the nature of a disease, the first circumstance to be determined is its cause; and this is commonly regarded as twofold. The predisposing cause or condition (for the term cause cannot fairly be used in this sense) is that state of any individual which renders him peculiarly liable to the attack of any or of some particular disease, of which another person or he himself at another time might be in little danger.

Of these predisposing conditions, the most important are hereditary disposition and those peculiarities of constitution which are acquired in the course of life by particular modes of living. There are also local peculiarities of individual organs of the body which render them especially liable to disease; such are the state bordering upon disease which is brought on by constant over-excitement of any organ; the condition of an organ which has once been affected with a disease, and which

is commonly thenceforward particularly liable to a repetition of it; the state of the organs which at different periods of life renders one more than another liable to disease, so that the same excitant will be most likely to produce in the child an affection of the head, in the youth a disease of the chest, and in the adult or old person some disorder of the abdominal organs.

Next to the predisposing causes of disease are to be considered the exciting causes, which consist of any changes of a certain extent in the conditions of the external circumstances in which man is placed. For example, a certain range of external temperature, a certain constitution of the atmosphere, a certain supply of pure food and drink, a certain amount of mental and bodily exertion, are circumstances essential to health, and alterations in any of them may produce disease, of which the nature and the seat will be determined in part by the predisposition of each individual, and in part by the peculiar mode of action of the excitant. Thus, after the same exciting cause (for example, exposure to cold and damp), one person may have rheumatism, another pleurisy, a third ophthalmia, and a fourth may escape altogether unharmed. But there are other excitants of disease which prevail over all predisposition, and produce a certain character of disease, which the constitution of the patient can only slightly modify; such are the materials of all contagious and epidemic disorders, as influenza, cholera, small-pox, measles, &c., which produce in all whom they attack a similar affection.

The nature of a disease being determined by the condition of the individual and the exciting cause to which he is exposed, the next division of *pathology* is the study of the symptoms or signs by which the progress of a disease is marked, and by which in practice its nature is to be determined. Of these signs of disease, many are expressive of the altered condition of the part chiefly affected, as pain in a wound, or a local inflammation, coughing in a disease of the lungs, sickness in a disorder of the stomach; but a greater number are the expressions of an affection of other organs, which suffer in association with those primarily diseased; such are pain in the head when the digestion is disordered, coughing in diseases of the liver, sickness after violent blows on the head.

Whether directly or indirectly produced, all the symptoms of disease are only the perversions of the natural functions of the part affected, or appreciable changes in its structure. Their value and meaning therefore can only be determined by a comparison with the same functions and structure in health; in other words, this, like all other parts of pathology, cannot be rightly studied without a constant reference to physiology. For a due performance of all the functions of organic life, a healthy structure of each organ, and a healthy composition of the blood, on which they all act and all depend for their own maintenance, are alike necessary.

The recovery from disease is an example of the exercise of that power by which the body can make unusual efforts to prevent its own destruction; this has been called the Vis Medicatrix Naturæ, or curative force of nature. The recovery from disease is rarely perfect. Although no visible change may be left behind, yet the part diseased is frequently for ever after weak, that is, more than usually liable to the same or to some other disease. The period occupied in the progress of a disease to recovery or death is the basis of the chief division of acute and chronic diseases. The severity of the symptoms may in both cases be the same; but in general those of chronic cases are less prominent than those of acute cases.

When the disease terminates fatally, or when death takes place from any other cause at a distant period from its occurrence, we obtain perhaps the most valuable because the most certain part of pathological knowledge, that of the material effects which the morbid process has produced. This, the study of morbid anatomy, is often specially called pathology. The practical value of this knowledge is the power which it affords of determining during life the nature of each disease, and the appropriate remedy for each.

PATMOS, a small island, one of the Sporades, near the south-western coast of Asia Minor, and about 30 miles S. of Samos, is now called Patino. It is chiefly known as having been the place of exile of the apostle St. John, who here wrote his Revelations. The island is a continuous rock about 15 miles in circumference, rugged and barren, except a few fertile spots; the coast is high, and forms many capes, with several good harbours. The only town is situated on a high rocky eminence rising abruptly from the sea; it consists of about 400 houses, which, with about 50 more at La Scala, or the landing-place, are the only habitations in the island. In the middle of the town is the monastery of St.-John, which was built by Alexius Comnenus. It is a massive building flanked with towers, and looks like a fortress. About half way up the mountain, between La Scala and the town, is a natural grotto, in which the natives say that St. John wrote his Revelations; they have built a small church over it. (Tournefort; Hilaire, *Voyage dans la Grèce.*)

PATNA, a city of Hindustan, the capital of Bahar, is situated in 25° 36′ N. lat., 85° 15′ E. long., on the south bank of the Ganges. The city within the walls extends about a mile and a half from N. to S., and three quarters of a mile E. to W. The streets are very narrow, and the houses are mostly of mud; the rest are of brick. The suburbs extend several miles along the Ganges, but the houses are placed irregularly, and with considerable spaces between them. The population is estimated at upwards of 300,000. Patna is a great mart for the opium trade, and much business is done in cotton and silk manufactures. It is also the seat of a large banking business.

PATRAS, the ancient PATRÆ, a town on the north coast of the Morea, about six miles S.W. of the entrance of the Gulf of Lepanto. It stands on a ridge of which the acropólis, or citadel, crowns the summit, and commands the view of a fine and fertile plain which stretches along the sea-coast. The plain of Patras produces a great quantity of currants, which form an article of

export. The hills are planted with vines, from which a good red wine is made. Many of the houses are surrounded by gardens, with orange, fig, pomegranate, and other fruit trees; but the houses themselves are ill built and mostly of wood. Patras is said to contain about 8000 inhabitants. (Leake's *Morea.*)

PATRIARCH (*πατριάρχης*, the head of a family), is a term which has been applied more particularly to the ancestors of the people of Israel down to the time of Moses, and especially to the twelve sons of Jacob, as the ancestors of the twelve tribes of Israel.

Patriarch, in Church History, was the ecclesiastical chief of a diocese, which included several provinces. It is not known at what time this title was introduced into the church; but before the fourth century the bishops of Rome, Antioch, and Alexandria, had obtained a degree of pre-eminence over the other bishops. In the time of Constantine the Great the bishop of Constantinople was made to rank with the three just mentioned; and either then or not long after the title of patriarch was given to these four prelates. The number of these dignitaries was increased in the fifth century. The patriarch of Constantinople reduced under his jurisdiction those of Antioch and Alexandria, and obtained the title of 'Universal Patriarch.' The bishop of Rome was called 'Prince of the Patriarchs.' The struggles of the patriarchs of Rome and Constantinople for supremacy was the chief cause of the separation between the Eastern and Western churches. The Greek church is at present governed by four patriarchs, namely, those of Constantinople, Jerusalem, Antioch, and Alexandria.

PATRICIANS (*Patres, Patricii*) was the appellation of the members of the original gentes, of which the Roman populus, the ruling power in the community, was at first composed, and of their descendants, either by blood or adoption. The gentes are said to have been three hundred. Each gens comprised several familiæ, which were distinguished by a surname, in addition to the name of the gens. Thus the gens Cornelia comprised the families of the Scipiones, the Lentuli, the Sullæ, &c. The members of the senate, the consuls, and the pontifices were exclusively chosen from the Patricians until B.C. 365.

PATRICK, ST., the apostle of Ireland, was born, according to Usher and Tillemont, in the year 372. The former places his death in 493, but Tillemont about the year 455. Nennius, published by Gale, says he died 57 years before the birth of St. Columba, and consequently in 464. The chief authentic information we possess concerning this saint is obtained from his own writings, his 'Confession,' and a letter which he addressed to Corotic, a prince in some part of Wales. From the 'Confession' we learn that he was born in a village called Bonaven Taberniæ, supposed to be the town of Kilpatrick at the mouth of the Clyde in Scotland, between Dumbarton and Glasgow. According to Nennius (abbot of Bangor, A.D. 620), St. Patrick's original name was Maur; that of Patricius was given to him by Pope Celestine when he consecrated him a bishop, and sent him as a missionary into Ireland A.D. 433.

PATRICK, SIMON, born 1626, died 1707, was educated at Queen's College, Cambridge, and appointed rector of St. Paul's, Covent Garden, London, till higher preferment was bestowed upon him; he became dean of Peterborough in 1679, bishop of Chichester in 1689, and bishop of Ely in 1691. He wrote many excellent works on practical divinity, such as 'Parable of the Pilgrim,' 'Exposition of the Ten Commandments,' 'The Christian Sacrifice,' 'The Devout Christian,' 'Jesus and the Resurrection justified.' Beside these, there are his Paraphrase and Commentary on the books of the Old Testament, which have been several times reprinted.

PATRON. [BENEFICE; PARISH.]

PATRO'NUS, derived from *pater*, a father, as *matrona* is formed from *mater*, a mother. The feminine of Patronus is Patrona. The relation of Patron and Client (*cliens*) in ancient Rome is stated in the article CLIENS. A manumitted slave (*libertus*) stood in a new relation to his master who manumitted him; and the master was called, with respect to him, Patronus. The manumitted slave received the gentile name of his Patronus. The Patronus had in certain cases a right to the property of the libertus upon his death, or to a part of it. By a law of the Twelve Tables, if the libertus died intestate and left no heir (*suus heres*) the Patronus succeeded to his property. (Gaius, iii. 40; Justin. 'Inst.' iii. tit. 7.) But this law was afterwards modified. The relation of patron and freedman involved numerous rules of law, the exposition of which belongs to another place. (Gaius, iii. 39-76; Ulpian, 'Fragm.' xxvii., &c.; 'Dig.' 37. tit. 14, 38. tit. 2 and tit. 4.)

PATRONY'MIC (*πατρωνυμικὸς*) is a name given by grammarians to those words which express the name of a person's father or ancestor. Thus Achilles is called Pelides (the son of Peleus), Agamemnon is styled Atrides (the son of Atreus), &c. In the English language we have no words of this description, but in Sanscrit and Greek they are very common, especially in Sanscrit, which has as many as thirteen different terminations to form such words.

PATTERSON. [NEW JERSEY.]

PAU, the capital of the French department of Basses-Pyrénées, is situated on the right bank of the Gave-de-Pau, 468 miles S.W. from Paris, in 43° 17′ 44″ N. lat., 0° 22′ 48″ W. long., and has 13,841 inhabitants. The town is situated on a height, and is divided into two parts by a deep ravine crossed by a bridge: the principal part of the town is on the south side of the ravine. There is a suburb, on the bank of the Gave-de-Pau, at the foot of the height on which the town stands. Pau is well laid out; the houses are well built, and are covered with a thick coating of mortar or cement. The poorer houses in the suburbs are chiefly of pebbles laid in very hard mortar. The principal object of interest is the castle, the birthplace of Henri IV., on the west side of the town. This building is an irregular Gothic structure, striking from its vastness and interesting from its historical associations. It is

kept in repair by the government. The room in which Henri was born is still shown. The castle, which commands a beautiful and extensive prospect, and has a fine park attached to it, was for a part of the year 1848 the prison-residence of the Arab chief Abd-el-Kader. There are two handsome squares in Pau, called La-Comédie, and La Place-Royale; the latter is planted with trees, and adorned with a fine pedestrian bronze statue of Henri IV. There is a good bridge over the Gave-de-Pau, leading from the Lower Town to the neighbouring town of Jurançon, celebrated for its wines. There are a court-house, a market-house, with a fountain in front of it, and several promenades. The town is the seat of a high court and University-Academy, which have jurisdiction over the departments of Basses-Pyrénées, Hautes-Pyrénées, and Landes; tribunals of first instance and of commerce; a public library, containing 18,000 volumes, and a college. The principal manufactures are carpets, linen, handkerchiefs, leather, and table covers. Trade is carried on in hams, salted legs of geese, wines, chestnuts, cotton yarn, cotton goods, and coarse woollens.

PAUILLAC. [GIRONDE.]

PAUL, ST., the great Apostle of the Gentiles, originally called Saul, was born at Tarsus in Cilicia. Though a Jew of the tribe of Benjamin, and a Pharisee of the most rigid sect, he was by birth a Roman citizen. The year of his nativity is not known. He was present at the martyrdom of Stephen, A.D. 34, on which occasion he is first introduced to our notice, and is called a young man. The active part which he took against the Christians, his conversion, and his subsequent labours in the cause of Christianity, are detailed in the New Testament.

St. Paul was the author of fourteen epistles to individuals, and to churches, on various points of Christian doctrine, practice, and discipline. He is supposed to have suffered martyrdom in A.D. 66; but the scripture history leaves him at Rome, where he was imprisoned in A.D. 61.

PAUL OF SAMOSATA was chosen bishop of Antioch in 260. In consequence of being supposed to hold heterodox opinions concerning the person of Christ, he was excommunicated in the year 269 by the synod of Antioch. It is probable that after being deprived of his bishopric, he continued to propagate his doctrines. His followers formed a sect under the name of Paulians or Paulianists, which seems to have lasted to the fifth century. They were condemned by the Council of Nice.

PAUL THE DEACON, or *Paulus Diáconus*, called also Warnefridus from his father's name, was born about the year 740, at the town of *Friuli* (Forum Julii). He became attached to the court of Rachis, king of the Lombards, and afterwards (about 763) he left the court and was ordained deacon of the church at Aquileia. He returned to the court on the invitation of Desiderius, successor of Rachis, by whom he was made chancellor. About 781 Charlemagne appears to have attached him to his court. He died about 799.

His poems consist chiefly of hymns and other short pieces in Latin. His fame rests however chiefly on his merits as an historian. His works were—1, 'Historia Miscella,' a Roman history; 2, 'De Gestis Longobardarum Libri Sex,' a history of the Lombards, his most valuable work; 3, 'Gesta Episcoporum Metensium;' 4, 'Life of St. Gregory the Great; 5, 'Excerpta' from Festus 'De Verborum Significatione.'

PAUL I. II. III. IV. V. [POPE.]

PAUL, FATHER, whose original name was *Pietro Sarpi*, was born at Venice, in 1552. Before the completion of his fourteenth year, he had, under the care of an uncle, who was master of a school, made great progress in mathematics and logic, as well as in general literature; and having become a pupil of the logician Capella of Cremona, who was of the Servite order, he took the vows of that order himself. He was soon after appointed to the professorship of divinity in the cathedral of Mantua. But a public life was little to his taste; and he shortly resigned his office. In his 22nd year, he had not only already mastered the Latin, Greek, Hebrew, and Chaldee languages, but was also a proficient in the civil and the canon law, in various departments of philosophy, in mathematics and astronomy, in chemistry, medicine, and anatomy.

The pursuit of such studies, no less than the freedom of his expressed opinions, drew upon him envy and suspicion; and he was twice arraigned before the Inquisition on a false accusation of heresy, and on a better-founded charge of having declared in a letter his detestation of the papal court and its corruptions. His high reputation protected him in both cases. The dispute which arose between the Pope, Paul V., and the Republic of Venice in 1606, drew Sarpi from his speculative retirement, and he opposed the claims of the pope with so much eloquence and effect, that the papal party were compelled to yield to the republic, and submit to an accommodation. Several attempts however were made to assassinate Father Paul; and even in his retreat at Venice, he was attacked one night as he was returning home to his monastery by a band of ruffians, who inflicted on him several wounds, but none of them were mortal. These attempts compelled Father Paul to confine himself to his monastery, and induced him to employ his constrained leisure by engaging in the great literary composition by which he is chiefly remembered, 'The History of the Council of Trent.' He died in 1623.

A Life of Father Paul was published in England in 1651, and also at Leyden in 1661; and a sketch of his fortunes and character is to be found among the collected works of Dr. Samuel Johnson. Editions of Father Paul's 'History of the Council of Trent,' were published in London, in Italian, English, and French, in 1619, 1676, and 1736; and of his whole works, in the original language at Verona and Naples, in 1761, 1768, and 1790.

PAUL I., Emperor of Russia, son of Peter III. and Catherine II., was born in 1754. He lost his father at an early age, and the death of

his brother Ivan, in 1763, made him heir apparent to the crown. He had good instructors, but was treated with great strictness by his mother as long as she lived, and was studiously kept in ignorance of all public affairs. In 1780 he travelled through Germany, France, and Italy, under the title of 'Comte du Nord.' On his return to Russia he continued to live in retirement, until 1796, when, on the death of Catherine, Paul, then 42 years of age, was proclaimed emperor. One of his first acts was to release the Polish patriot Kosciuzko, who was confined as a state prisoner, and he gave him money to enable him to go and live in the United States. He likewise liberated Pototsky and the other unfortunate Poles who were confined at Schlüsselburg and other fortresses. These acts gave hope of a good reign, but Paul's character soon showed itself in all its capriciousness and violence. He liked to interfere in the most minute details of police and of military discipline, which caused much discontent among the soldiers and numerous desertions, a thing almost unknown till then in the Russian army. In the same spirit, Paul, whose wish was to alter rather than to improve, remodelled all the departments of administration, and all the courts of the empire, in consequence of which thousands of civil officers were thrown out of employment.

In his foreign politics Paul at first seemed disposed to adopt a system of neutrality in the great quarrel between France and the allied powers. But the invasion of Switzerland, of Rome, Naples, Malta, and Egypt, by the French, determined him for war. He sent one army into Italy under Suwarrow, and another into Switzerland under Korsakow. Suwarrow was at first successful, but, Korsakow was defeated, and both armies were ultimately withdrawn. Paul withdrew from the coalition and thus offended the allies, but at the same time made no proposals of peace to France. He thus displeased everybody, and showed himself fickle, passionate, and weak. His private conduct partook of the same character. The soldiers detested him for his vexatious minuteness in discipline, the nobility for his rude and often cruel behaviour, and men of information for his proscription of books and journals. Paul quarrelled with England because she refused to give up the island of Malta to him, and Bonaparte bethought himself of profiting by this circumstance in order to gain his friendship. He accordingly collected all the Russian prisoners in France, clothed them, supplied them with muskets, and sent them back to Russia. This produced its effect, and Paul, who had proclaimed himself the champion of legitimacy, became all on a sudden a great admirer of Bonaparte.

His next step was to seize the English vessels and other property in his harbours, because England had sent a fleet to Copenhagen in August, 1800, to oblige Denmark to acknowledge the navigation laws and the right of search of neutral vessels. In December of the same year, Paul concluded a convention with Sweden and Denmark, to which Prussia soon after acceded. In consequence of this step England put an embargo upon the vessels of the Baltic powers.

In February, 1801, Bonaparte secretly concerted with the court of Russia the plan of an expedition to India. Meantime England had sent a fleet into the Baltic, under Parker and Nelson, to dissolve the maritime coalition. Nelson attacked the Danish fleet, April 2, and on the 4th an armistice was signed between Denmark and England. While the armistice was being concluded, news arrived of the sudden death of Paul, who was strangled by some of his own officers, on the night of the 24th of March, 1801, after having refused to sign an act of abdication. The Baltic coalition was thereby dissolved. Paul's son Alexander was proclaimed emperor.

PAUL VERONESE. [Cagliari.]

PAULIEN, ST. [Loire, Haute.]

PAULINUS (*John Philip Werdin*), was born near Mannersdorf in Austria, April 25, 1748. He studied philosophy and theology at Prague, and afterwards learned some of the oriental languages in the college of the Carmelites at Rome, which order he had joined in 1769. He was sent to the coast of Malabar in 1774, where he remained for 14 years, and was successively appointed vicar-general and apostolic visitor. In 1790 he returned to Rome in order to superintend the religious works which were printed by the Propaganda for the use of the missionaries in Hindustan. He died at Rome, Jan. 7, 1806.

Paulinus was one of the earliest Europeans who acquired a knowledge of the Sanscrit language. His Sanscrit Grammar was published at Rome, in 1790, and also in a fuller and different form in 1804; but both these works have been superseded by the more accurate and complete grammars of Wilkins and Bopp. Paulinus also wrote and edited many other works.

PAULINUS SUETONIUS. [Boadicea; Britannia.]

PAULUS ÆGINE'TA, so called from his birth-place, the island of Ægina, is one of the latest and at the same time one of the most valuable of the ancient Greek medical writers whose works are still extant. Suidas says he wrote various medical works; and Abulfaraj, that he composed a treatise on medicine, in nine books, and one on female diseases. The latter work is lost; the former still remains, with the title Ἐπιτομῆς Ἰατρικῆς Βιβλία ἑπτά, 'Compendii Medici Libri Septem.' He appears to have been much esteemed by the Arabians, who, on account of his skill in midwifery and female diseases, called him *Al-Kawabeli*, 'the accoucheur.' The first volume of an English translation of his work, with a copious and learned commentary, by Francis Adams, was published, Lond., 1834, 8vo.

PAULUS ÆMILIUS. [Æmilii.]

PAULUS, JU'LIUS, one of the most distinguished of the Roman lawyers, was the contemporay of Ulpian. The place of his birth is unknown. Paulus was also a contemporary of Papinian. He was made Præfectus Prætorio by Alexander Severus, or, according to others, by Elagabálus. Paulus was perhaps the most voluminous of all the Roman writers on law, and the extracts from his writings, which are contained in the 'Digest,' are more in number and amount

than those from any other writer except Ulpian. His style is concise, and sometimes obscure: he was subtle in thought, clear and comprehensive in his judgments. The five books of his 'Receptæ Sententiæ,' are preserved in an imperfect shape in the 'Breviarium.' [BREVIARIUM.]

PAUPERISM. [POOR LAWS.]

PAUSA'NIAS, son of Cleómbrotus, was of that royal house in Sparta which traced its descent from Eurysthenes. Aristotle calls him 'king,' but he only governed as the cousin-german and guardian of Pleistarchus, who succeeded to the throne on the death of Leonidas.

Pausanias commanded the Grecian army at the battle of Platæa, B.C. 379. This victory made him arrogant, and his conduct during his subsequent command of the confederate Greeks on the coast of Asia Minor disgusted the allies, and he was recalled to Sparta. He was put on his trial, but appears to have been acquitted, upon which he went to the Hellespont in a private capacity on the pretence of joining the army, but really to intrigue with the Persian king. He was again summoned home, and his treachery was finally betrayed by one of his emissaries. The Ephori proceeded to arrest Pausanias, but he took sanctuary in a temple of Athena at Sparta. The Ephori shut him up there till he was dying of hunger, when he was carried outside, and expired. (Thucydides, i. 132, &c.)

PAUSA'NIAS, the author of the 'Description or Itinerary of Greece' (Ἑλλάδος Περιήγησις). Little or nothing is known of him, except what may be collected from his own work. The 'Description of Greece' consists of ten books: the first contains the description of Attica and Mégaris; the second, Corinthia, Sicyon, Phlius, and Árgolis; the third, Laconica; the fourth, Messenia; the fifth and sixth, Elis; the seventh, Achæa; the eighth, Arcadia; the ninth, Bœotia; and the tenth, Phocis.

It appears from incidental notices in the work, that Pausanias not only visited the places which he has described, but also many other remote parts. The work of Pausanias is not geographical: it is merely a description of places, with an account of temples, theatres, and works of art; but it contains many curious notices of other things. Pausanias was a careful observer, a collector of mythological stories and traditions, and a painstaking registrar of the remains of Grecian art. If he was not a great critic in painting and sculpture, he has at least most carefully described what he saw, and his work is the most valuable record that we have of the great works of Grecian genius. He made his tour through Greece in the time of Antoninus Pius.

Among the latest and best editions of Pausanias is that of Bekker, Berlin, 1826-7. There is an indifferent English translation by Thomas Taylor.

PAU'SIAS, a native of Sicyon, studied encaustic in the school of Pamphilus, where he was the fellow-pupil of Apelles and Melanthius. Pausias was the first painter who acquired a great name for encaustic with the cestrum, and who introduced the custom of painting the ceilings and walls of private apartments with historical and dramatic subjects. The most famous work of Pausias was the sacrifice of an ox, which in the time of Pliny was in the hall of Pompeius. Pausias in his youth loved a native of his own city, Glycera, who earned her livelihood by making garlands of flowers and wreaths of roses. A portrait of Glycera with a garland of flowers was reckoned amongst his masterpieces. Other works by Pausias are noticed by Pliny (Hist. Nat. xxx., 11, 40).

PAU'SSIDÆ, a family of Coleopterous Insects, the precise affinities of which have not yet been satisfactorily determined. By Latreille the Paussidæ are placed between the *Scolytidæ* and the *Bostrichidæ*; but Mr. Westwood (who has devoted much attention to this group of beetles, and has published a monograph on them in the 16th volume of the 'Linnean Transactions') is of opinion that the Paussidæ possess affinities with the *Trogositarii*, and are still more nearly allied to the *Cucujidæ*.

Between twenty and thirty species of this family are known, a great portion of which are figured and described by Mr. Westwood in the monograph before alluded to, and in a supplement to this monograph published in the second volume of the 'Transactions of the Entomological Society,' to which works the reader is referred for a more detailed account of these very curious insects. Of their habits little is ascertained; they are confined to the Old World, and almost entirely to the tropical portions. They are said to be nocturnal, and are supposed to live in wood or under the bark of trees: most of the specimens in cabinets have been found in newly-built houses. One species is said, when touched, to make discharges of some volatile fluid, in the same manner as the species of *Brachinus*.

PAUW, CORNELIUS, born at Amsterdam in 1739, studied at Göttingen, and was afterwards made canon of Xanten, in the duchy of Cleves. He applied himself to literature, and wrote 'Recherches Historiques sur les Americains,' 'Recherches sur les Grecs,' and 'Recherches sur les Egyptiens et les Chinois.' The French Revolution, and the subsequent invasion of the duchy of Cleves, deprived Pauw of his peace of mind. He became dejected, and burnt all his papers, among which was the manuscript of his 'Recherches sur les Germains,' which is said to have been the most elaborate of his works. He died at Xanten, in 1790.

Another member of the same family, *John Cornelius Pauw*, born at Utrecht towards the end of the 17th century, was a good classical scholar, published editions of several Greek classics, and wrote notes on Pindar.

PAVIA, a province in Austrian Italy, is bounded N. by the Milanese, E. by Lodi, W. by Sardinia, from which it is separated by the Ticino, and S. by Sardinia and Parma, being divided from both by the Po. The province of Pavia is one of the most fertile provinces in Lombardy, lying entirely in the fine plain of the Po. It produces corn, wine, fruit, hemp; and has good pasture land. The length is about 40 miles from N.W.

to S.E., but the breadth does not exceed 10 miles. The population amounts to 160,000. The province is divided into eight districts, and 193 communes. Two navigable canals, the Naviglio-Grande and the Naviglio-di-Pavia, cross the province, and supply water communication between Milan and the Lago Maggiore, the Ticino and Po, and by the latter river with the Adriatic.

The capital is *Pavia*, a well-built city of about 24,000 inhabitants, situated on the left bank of the Ticino, a few miles above its junction with the Pò. A handsome covered bridge over the river connects Pavia with the suburbs of Borgo-Ticino, on the right bank. The cathedral, which is a modern structure, was rebuilt in the last century; it contains some good paintings. The oldest church in Pavia, and perhaps in Italy, is that of San-Michele, which is asserted by some antiquarians to have been built in the 6th century, by others in the 11th century. Several old and curious basso-rilievos adorn this church, as well as some frescoes of the age of Giotto. The vast church Del-Carmine, which was built in the 14th century, contains some valuable paintings. That of Santa-Maria-Coronata was built by Bramante, and is also rich in paintings. The once handsome church of San-Pietro 'in Cielo d'Oro,' noticed by Dante ('Paradiso,' x.), was not long ago used as a military storehouse.

Pavia is chiefly known for its university, which contains 13 colleges; the faculties are those of law, medicine, and philosophy. Pavia has long been renowned for its medical and surgical instruction. A valuable library, a museum of natural history, a cabinet of anatomy, and a botanical garden are annexed to the university. Three colleges, Caccia, Borromeo, and Ghislieri, the first two founded by the noble families of those names, and the third by Pope Pius V., support about 120 students gratuitously. The college Borromeo is a magnificent building. The marquis of Sannazzaro has lately founded an establishment for forming skilful artists near to his splendid palace. Pavia gives title to a bishop; it has a large hospital, a house for foundlings, and other benevolent institutions.

Pavia, called *Ticinum* by the Romans, was a town of Cisalpine Gaul; little mention is made of it in Roman history. The Lombard kings resided in Pavia. Near it Francis I. was defeated and taken prisoner by Charles V. in 1525. Five miles from Pavia, on the road to Milan, is the *Certosa*, a splendid Carthusian monastery, now suppressed. It was built by Gian Galeazzo Visconti, duke of Milan, whose monument is in the church: the church is rich in sculptures, marble, and fresco paintings.

(*La Certosa di Pavia descritta ed illustrata con Tavole*, by Durelli, fol., Milan, 1823-30.)

PA'VIA is a small division of the natural order *Æsculaceæ*, consisting of small trees or bushes with yellow or red flowers, inhabiting North America, and often cultivated in shrubberies under the name of the Yellow or Scarlet Horse-Chestnut.

PAVO (the Peacock), a constellation of Bayer, which occupies a part of the space situated between Sagittarius and the South Pole.

PAVONIA, a genus of plants belonging to the natural order *Malvaceæ*. *P. diuretica* is native of Brazil, in the province of Minas Geraes. A decoction of this plant is used in Brazil as a diuretic.

PAVO'NIDÆ, Peacock Family, Mr. Swainson's name for a family of Rasorial Birds.

Mr. Vigors admits no such family as *Pavonidæ* into his group of the *Rasores*; but its place is supplied by the *Phasianidæ*, a family which does not exist in Mr. Swainson's system.

Mr. G. R. Gray makes the *Pavonidæ* (the first subfamily of the *Phasianidæ*, according to his arrangement) consist of the genera *Polyplectron*, *Crossoptilon*, and *Pavo*. The fourth subfamily, according to the same author, is composed of the genera *Meleagris*, *Numida*, *Guttera*, and *Acryllium*. ('List of the Genera of Birds,' 1840.)

Phasianus, with its subgenera, *Tragopan*, *Gallus*, and *Euplocamus*, are treated of under the title PHEASANTS.

The following genera may be here noticed:—

Genus I. *Pavo*. Examples.—The well-known Common Peacock (*Pavo cristatus*) originally from India, but now extensively spread as a domestic bird through Europe. The Java Peacock (*Pavo Japonensis*, Aldrov.; *Pavo Javanicus*, Horsfield; *Pavo spiciferus*, Vieillot; *Pavo Aldrovandi*, Wilson; *Pavo muticus*, Linn.). This splendid bird is a native of Java, Sumatra, and Birma.

Genus II. *Meleagris*. Examples.—The Common Turkey (*Meleagris Gallopavo*), originally from North America, but now domesticated throughout Europe and India. (Audubon, and the Prince of Canino, in continuation of Wilson's 'North American Ornithology.') The Honduras Turkey (*Meleagris ocellata*, Cuvr.), a magnificent species, the habits of which are not known. From the woods of Honduras.

Genus III. *Polyplectron*. This beautiful form was raised to the rank of a genus by M. Temminck, who established it upon the bird which was named *Pavo Thibetanus* by Brisson, *The Chinese Peacock Pheasant* by Edwards, *Pavo bicalcaratus* by Linnæus, and *L'Eperronier* by Buffon. Cuvier placed it among the Peacocks, properly so called, but other species have been

Crested Polyplectron (*Polyplectron emphanum*).

since discovered, which, throwing further light upon the modifications of form, well justify its genuine separation. It is the *Diplectron* of Vieillot.

Example.—*Polyplectron emphanum.*

Locality, Sunda, the Moluccas, Tibet, &c.

Genus IV. *Argus.* Example.—The Argus Pheasant (*Argus giganteus*). Locality, Malacca, Sumatra, and probably other adjacent islands.

Beautiful Chinese Pheasant (*Argus giganteus*).

In the adult male the extraordinary development of the secondary quill-feathers of the wings forms an impediment to the bird in its progress through the air, but they assist its pace when running, which it does swiftly with their aid. Its flight, when it does rise on the wing, is heavy and short. When the bird is at rest or unexcited, the beauty-spots on the secondaries are hardly visible; but when showing himself off in the presence of his females, the wings of the Argus are expanded, and trailed upon the ground to display their beauties; and at this time the tail is comparatively spread, and is raised erect; when at rest it is carried in a line with the body, and with the two long feathers folded together. The rest of its habits are not known, but it is said not to thrive well in confinement.

Genus V. *Lophophorus.* Example.—The Impeyan Pheasant (*Lophophorus Impeyanus*). Locality, Nepaul and the Himalayas. Its food consists principally of bulbous roots, for the scooping up of which its bill is well adapted.

The male is arrayed in resplendent plumage, but we must refer our readers to the bird itself, or to the excellent figure in Mr. Gould's 'Century of Birds from the Himalaya Mountains,' for anything like an adequate idea of the beauty of its tints; for the greater proportion of the plumage is dazzling with changing hues of green, steel-blue, violet, and golden bronze. The bird looks as if it were principally clothed in a scale-armour of iridescent metal; but the plumage is soft and velvety to the touch. The crest on the head consists of naked-shafted feathers, with an oval or battledore tip of the same quality as the rest of the plumage, and of a metallic green. The centre of the back is pure white. The tail is rounded, and bright chestnut. Size of a hen turkey.

The female is much smaller. Her plumage is altogether sombre, and without a trace of the splendour which shines forth in the male. The feathers of the head are a little lengthened behind, but not in any degree like the crest of the male. Fore part of the neck pure white; rest of the plumage reddish-brown variegated and mottled with spots and bars, except a little white at the extremity of the tail-coverts and tips of the tail-feathers.

The young male is much like the female.

Genus VI. *Numida.* The birds known to the ancients under the name of *Meleagrides* and *Gallinæ Numidicæ* belong to this genus. They are all natives of Africa, living principally on berries, small slugs, &c. We select as examples *Numida Meleagris*, and *Numida cristata.*

Numida Meleagris.—This, the *Gallina di Numidia* of the Italians, *Poulle de la Guinée* and *Peintade Meleagride* of the French, *Pintado* of the Spanish, *Perl Huhn* of the Germans, and *Pearl Hen, Guinea Hen,* and common *Guinea Fowl* of the British, is too well known to need description. The bird has been spread very widely, and few poultry yards are without it. In Jamaica, where they do much mischief to some of the crops, they have resumed their wild habits, and are shot like other game."

The *Numida cristata* is the *Peintade à Crête* and *Peintade Huppé* of the French, and *Crested Pintada* of Latham. It is the genus *Guttera* of Wagler. Locality, Africa, Great Namaqua country.

Several other species of *Numida,* or Guinea Fowl, have been described, some of which are remarkable for beauty.

PAWN. [PLEDGE.]

PAWNBROKERS. All persons who receive goods by way of pawn or pledge for the repayment of money lent thereon at a higher rate of interest than five per cent. per annum are pawnbrokers. In pawning, the goods of the borrower are delivered to the lender as a security. [PLEDGE.]

The business of lending money on pledges is in many countries carried on under the immediate control of the government as a branch of the public administration; and where only private individuals engage in it, as in this country, it is placed under regulations. Thus in China, where pawnbrokers are very numerous, Mr. Davis says ('Chinese,' vol. ii., p. 438) they are under strict regulations. [MONT DE PIE'TE'.]

The 12 Anne, stat. 2, c. 16, fixed the legal rate of interest at 5 per cent. per annum; but the interest which pawnbrokers are allowed to charge is regulated by a special statute, the 39 & 40 Geo. III. c. 99, passed 28th of July, 1800. This act fixes the rates of interest allowed on goods or chattels placed in the hands of pawnbrokers according to a scale.

The Pawnbrokers' Act prohibits pledges being taken from persons intoxicated or under twelve years of age; and by the Metropolitan Police Act (2 & 3 Vict., c. 47), a fine of 5*l.* is inflicted upon

pawnbrokers taking pledges from persons under the age of sixteen.

Pawnbrokers are required to take out an annual licence from the Stamp Office; and, to enable them to take in pledge articles of gold and silver, a second licence is necessary, which costs 5*l.* 15*s.* Those who carry on business within the limits of the old twopenny-post pay 15*l.* a year for their licence, and in other parts of Great Britain 7*l.* 10*s.* The licence expires on the 31st of July, and a penalty of 50*l.* is incurred if it is not renewed ten days before. No licence is required in Ireland, but those who carry on the business of a pawnbroker must be registered.

In 1833 the number of pawnbrokers in the metropolitan district was 368; 386 in 1838; and 383 in 1842; in the rest of England and Wales the number was 1083 in 1833; 1194 in 1838; and 1304 in 1842; in Scotland the number was 52 in 1833; 88 in 1838; and 133 in 1842: making a total of 1820 establishments in 1842, which paid 16,522*l.* for their licences, besides the licence which many of them take out as dealers in gold and silver.

PAXO. [Ionian Isles.]

PAYMENT. If a man owes several sums of money to another on different accounts, and makes a payment of part or of the whole of any one of such sums, he may state at the time of payment on which account such sum is paid, and the payment will be considered to be appropriated to the debt which he has named. If at the time of payment the debtor makes no appropriation of the payment, the creditor may at the time of payment appropriate it to such debt as he pleases, provided he so appropriates the payment, as he would do, or as it may be presumed that he would do, if he were the debtor. Accordingly the creditor must appropriate the payment to such debt as is the most burdensome to the debtor. If neither party make any appropriation of the debt at the time of payment, the payment will be presumed to be made on account of the more burdensome debt; if there is no difference in the quality of the debts, the payment must be presumed to be made on account of the oldest.

These are the rules of the Roman law ('Dig.' 46, tit. 3), which perhaps may be considered to be adopted by the English law, though the decisions are by no means uniform. (Devaynes *v.* Noble, 1 Mer. 606.) The principles just laid down apply to distinct debts on different accounts (causæ). If there are dealings between two persons which are all of one uniform and continuous nature, as for instance between a banker and his customer, there is no question of appropriation of payment. The customer pays money into the bank at different times, and draws it out by drafts at different times. All the sums paid in and all the sums paid out severally make an entire creditor and debtor account, and by striking the balance at any given time it will appear what sum is due at that time from the banker to his customer, or from the customer to his banker. It is true that this supposes a kind of appropriation, but not exactly that kind which is meant by the term. It assumes that the sum first paid in is discharged by the sum first paid out, so far as it is sufficient to discharge it; and the same remark applies to all subsequent payments into the bank and sums drawn out. The account therefore must be made out in the order of time, and the balance will show how the account stands at the time when it is made out. (Devaynes *v.* Noble.)

There are various cases in the English reports in which the question of appropriation of payments has been discussed. (Boddenham and Purchas, 2 B. and Ald. 39; Simpson and Ingham, 2 B. and Cr. 65; Pemberton and Oakes, 4 Russ. 154; and others.)

PAZ, LA, a town in Bolivia, situated near 16° 50′ S. lat., 69° W. long., stands in a deep ravine formed by the Chuquecapo. The ravine is inclosed by high and steep mountains, and contains little level ground; but it is cultivated with great care wherever cultivation is practicable. The streets are very irregular, and some of them extremely steep. The town, which gives title to a bishop, and has a flourishing college, contains many extensive dwelling-houses, built in the Spanish fashion, and covered with tiles. The greater part of the houses however are only mud-huts, and inhabited by Indians. La Paz is the most commercial town in Bolivia. Merchandise is conveyed to this place from the coast of Peru, and hence into the interior. The surrounding country produces no article of export except gold and bark. The population is said to be about 10,000. A few miles E.S.E. of La-Paz rises the Nevado-d'Illimani, one of the highest mountains in the Andes.

PEA. The garden pea (*Pisum sativum*) is a native of the south of Europe, but sufficiently hardy in a young state, or when its development is not much extended, to bear our winters when they are moderate, and when the plants have, as in gardens generally, a sheltered situation.

The varieties of the pea are numerous. The best account of them will be found in the 'Transactions of the Horticultural Society,' 2nd series, vol. i., where 43 varieties, comprising no fewer than 175 synonyms, are arranged and described.

The following is a selection of the more useful varieties:—For early sowing—Early Dwarf, Early Frame, Early Charlton, and D'Auvergne, a particularly excellent sort.

For the principal summer crop—Blue Prussian, White Prussian, Groom's Superb Dwarf Blue, Dwarf Green Marrow, Knight's Dwarf Marrow.

For late sowing—Knight's Tall Marrow.

The soil for peas ought to be fresh and well stirred, but not too rich; for in the latter case a luxuriant growth is induced without fertility.

The times of sowing are, in November for the earliest crop, and at intervals of a month, three weeks, or a fortnight, as the season advances, till Midsummer. The produce from any that may be sown after this period is very uncertain; as is indeed the case with the November and other sowings previous to those of spring. The shelter afforded the young plants in winter by spruce branches or temporary awnings is of course beneficial. Various plans have been suggested for forwarding peas under glass, so as to transplant

in the end of February or in March into the open ground. The best mode is to sow in small pots, and at the proper season to turn out the plants with the ball of earth and roots as entire as possible, to plunge them at short intervals in rows, and to shelter them by sticks of a branching nature and fan form.

The distance which should be allotted for the intervals between the rows of peas may be three, four, five, or six feet, according to the growth of the sort and richness of the soil. The plants should not be allowed to grow too thick in the rows, otherwise they are drawn up slender, without a due proportion of foliage on the lower part of the stem, which, in that case, as well as the leaves depending on it, is apt to become unhealthy and to mildew.

PEACH. The Peach-Tree (*Amygdalus Persica*, or *Persica vulgaris*) is generally considered to be more especially a native of Persia. It was known to the Romans, and brought to Italy, where it became distinguished by the name of *Persica*; and this name it still retains under various modifications in the different countries of Europe. But the peach is not indigenous solely in Persia, for it has been found growing wild in various parts of Turkey in Asia. The peach bears our winters unhurt, if they are not unusually severe.

From the natural climate and habit of the peach-tree, it is obvious that when forced it must be flowered under a comparatively low degree of temperature. It cannot therefore be well forced simultaneously with the vine, for the temperature of March, which in this climate serves to bring the peach into flower, does not unfold the buds of the vine, this being only effected a month or six weeks farther in the season by a mean temperature of 55°.

Light is so essential, that unless peaches be trained near the glass, the fruit will neither acquire due colour nor flavour. Vicissitudes of dryness and moisture must be avoided. The roots should be well supplied with water before the fruit begins to ripen off, because at a later period none can be applied without deteriorating the flavour.

The peach is propagated exclusively by budding; rarely on the peach stock, but frequently on the almond, especially in France. In this country however it is propagated almost entirely on the plum stock, which is not only much hardier, but also possesses the property of spreading its roots nearer the surface than either of the two preceding kinds; thereby affording to the peach a more congenial nourishment in consequence of the roots being within the influence of the solar heat.

The peach succeeds in any rich fresh loamy soil; but the subsoil, like that for all fruit-trees, ought not to be retentive, and a very complete mode of drainage is absolutely necessary.

Thinning the fruit is generally done much too sparingly. The vigour of the tree should of course be taken into consideration. As a general rule, one fruit on each bearing shoot, or two at most, are all that ought to be left. Some remove the flower-buds to a considerable extent, a practice which is very proper. It is advisable however to preserve several on each shoot, in order that a choice may be made of one or two of those likely to take the lead.

The surface of the border should be frequently stirred; and when the weather is dry, watering will be necessary both for the border and foliage; but the use of cold spring water must be avoided. The ravages of the green fly must be carefully guarded against. The best known remedy is to dust the tree, after syringing, with snuff, or powdered tobacco leaves.

PEACOCK. [PAVONIDÆ.]

PEAR. The wild pear-tree (*Pyrus communis*), from which the numerous cultivated varieties have originated, has a wide indigenous range, extending over a great part of Europe and Asia, within the limits of temperate regions. It is to be met with in certain localities in the southern parts of Britain. The old varieties of pear are however getting rapidly out of cultivation, and giving place to others of recent origin, superior in quality, and much better adapted for this climate than the old kinds appear to have been. Few of the old kinds could be successfully cultivated without the aid of walls; whereas most of the new varieties produce abundance of excellent fruit on standards or dwarfs in the open ground. Even in France the old varieties are now decaying, although the climate is there most congenial to them.

The pear is chiefly propagated by grafting or budding on the wild pear stock, or on stocks raised from the seeds of cultivated pears, called free stocks. The former are however to be preferred. It is also grafted on the quince, which is most proper for dwarf trees, or for moist soil, and has also the effect of bringing the trees earlier into a bearing state. It may be also grown upon the medlar, and the white thorn (*Cratægus oxyacantha*), but on these the disparity of growth between the respective stems occasions a short duration of the union.

The pear-tree will thrive in any rich loamy soil; but it is only where the subsoil is naturally congenial, or rendered so artificially, that it will continue to produce good crops of well flavoured fruit. A clay subsoil is bad, and so is in fact any other that will hold water. Good drainage is absolutely necessary, and shallow planting cannot be too much recommended.

Manure is not so liable to prove injurious to the pear and apple as it is to stone-fruits. On the contrary, manure, judiciously applied, will always prove beneficial.

The modes of training the pear-tree are various. Against walls, the three principal methods are the fan-shape, its reverse the pendulous, and intermediately the horizontal, which is that most generally adopted. In the fan method the central part of the tree, from the upright position of the branches, or their near approach to such, is apt to become too strong. On the contrary, the pendulous training induces debility when the trees begin to bear heavy crops. By annually cutting back a central shoot to about a foot, and training branches horizontally, right and left, the vigour of the tree is equally distributed.

In the cultivation of pears as standards, the head is allowed to take nearly its natural course, being only subjected to such regulations, by pruning, as are necessary to preserve the equality of the principal branches with regard both to strength and distance; and likewise to render the whole sufficiently thin, in order that the sun's rays may be freely admitted.

The pruning of standard pear trees is usually confined to the winter regulation of the branches by thinning, and shortening where the subdivision of branches is desirable or where they are too weak. Wall and espalier trees require both a summer and winter pruning.

PEARCE, ZACHARY, born 1690, died 1774, was the son of a distiller in London. He was educated at Westminster School and Cambridge, took orders, and obtained a living. He was made dean of Winchester in 1739, in 1748 bishop of Bangor, and in 1756 bishop of Rochester, with the deanery of Westminster annexed, which he afterwards resigned. Bishop Pearce published an edition of Longinus 'On the Sublime,' in Greek, with a new Latin version. Besides single sermons and tracts, he was also the author of 'A Commentary, with Notes, on the Four Evangelists and the Acts of the Apostles, together with a new translation of St. Paul's First Epistle to the Corinthians,' 2 vols. 4to., 1777.

PEARL. [SHELL.]

PEARL-ASH. [POTASSIUM.]

PEARL-HEN. [PAVONIDÆ.]

PEARL-SPAR, a mineral which occurs in lead mines. It is grayish and translucent; and consists chiefly of carbonic acid, lime, and magnesia.

PEARSON, JOHN, was born in 1613. He was educated at Eton, whence he went to Cambridge. He took holy orders in 1639. Lord-Keeper Finch appointed him his chaplain, and presented him to the living of Torrington in Suffolk. But the chief scene of his labours as a parochial minister was in London, where he had the living of Saint Clement Eastcheap, and it was to the inhabitants of that parish that the lectures were delivered which afterwards formed his celebrated 'Exposition of the Creed.' On the Restoration, Pearson was created doctor of divinity, made a prebendary of Ely, archdeacon of Surrey, and master of Jesus College, Cambridge. In 1661 he was appointed Lady Margaret's professor of divinity, and in 1662 master of Trinity College, Cambridge. In 1672 he succeeded Wilkins in the bishopric of Chester. He died at Chester, July 16, 1686. The 'Exposition of the Creed' is the work by which Bishop Pearson is chiefly remembered.

PEAT is a substance of vegetable origin, found wherever the soil has been long soaked with water which has no outlet and does not completely evaporate by the heat of the sun.

When dried peat is examined, it is found to consist of roots and fibres in every stage of decomposition, from the natural wood to the completely black vegetable mould. From the nature of its formation under the surface of the water, it acquires a portion of tannin, which has the property of preserving animal and vegetable matter from decomposition. Hence large branches and trunks of trees are found imbedded in peat, which have no mark of decomposition, except what may have taken place before the wood was completely immersed in the peat. Peat contains all the elements of the richest manure, and may by an easy process be converted into humus: for this purpose the agency of alkalis is the most effectual. If the tannin be decomposed, that of the vegetable fibre will go on, and soluble humus will be formed. When peat is newly dug up, if caustic lime be added to it before it is dry, the moisture of the peat slakes the lime, which acts on the gallic acid in the peat and neutralises it. If this mixture be then excited to fermentation by the addition of animal matter, such as urine or dung, oxygen is absorbed and carbonic acid evolved; and the residue is converted into an excellent manure, containing much soluble humus. The same may be effected more slowly by mixing peat with clay or marl, and allowing the mixture to remain exposed to the atmosphere for a considerable time, frequently turning it. But nothing accelerates this process like the addition of putrescent animal matter, which acts as a ferment and greatly hastens the decomposition.

The soils for which peat forms the best manure are the chalky and clayey. Sand has too little tenacity; it lets the gases produced by the decomposition escape, instead of attracting them, as clay and chalk do, and thus preventing their escape.

PECCARY. [SUIDÆ.]

PE'CCHIO, GIUSEPPE, born at Milan in 1785, studied the law in the university of Pavia. After his return to Milan in 1810 he was appointed assistant counsellor of state for the departments of finances and the interior of the kingdom of Italy. In 1814 he lost his situation, in consequence of the Austrian occupation of Lombardy, a circumstance which gave occasion to his work entitled 'Saggio Storico sulla Amministrazione Finanziera dell' ex-Regno d'Italia dal 1802 al 1814,' which is a useful book of reference for the history and statistics of that kingdom. In 1819 he was appointed deputy to the Congregazione, or provincial assembly of Milan. In 1821, being seriously implicated in the attempt at an insurrection against the Austrian government, he travelled in Switzerland, Spain, and Portugal. Having in the course of his travels visited England, he was appointed in 1825, together with Count Gamba, by the Philhellenic Committee to convey to Greece the sum of 60,000*l.*, the fruits of a loan made for the Greeks. Pecchio's account of the affairs of Greece was published in English, with that of other contemporary travellers: 'A Picture of Greece in 1825, as exhibited in the Narratives of James Emmerson, Joseph Pecchio, and W. H. Humphreys,' 2 vols. 8vo.

On his return to England, towards the end of 1825, Pecchio repaired to Nottingham, where he gave lessons in the modern languages, and he afterwards removed to an academy at York in the same capacity. Towards the end of 1828 he married an English lady of property, and went to reside with her at Brighton, where he died in June, 1835.

The most important perhaps of Pecchio's works

is his 'Storia della Economia Pubblica in Italia,' 8vo., Lugano, 1829.

PECK, a measure of two gallons, or the fourth part of a bushel. It is used as a measure of dry goods only.

PECK, FRANCIS, born May 4, 1692, at Stamford, in Lincolnshire, took the degree of B.A. in 1715, and M.A. in 1727, at Trinity College, Cambridge. In 1723 he was presented to a rectory in Leicestershire; and in 1736 he received a prebendal stall in the cathedral of Lincoln. His principal works were:—1, 'The Antiquarian Annals of Stamford, in Lincoln, Rutland, and Northampton Shires,' fol., London, 1727. 2, 'Desiderata Curiosa,' London, 1732-5. 3, 'A Catalogue of all the Discourses written both for and against Popery in the time of King James II.,' 4to., London, 1735. 4, 'New Memoirs of the Life and Poetical Works of Mr. John Milton,' 4to., London, 1740. 5, 'Memoirs of the Life and Actions of Oliver Cromwell,' 4to., London, 1740. Besides these he published several sermons and poems, and, in 1742, his last work, a volume of religious discourses. Among his manuscripts, the greater part of which became the property of Sir Thomas Cave, Bart., were five volumes in 4to., fairly transcribed for the press, entitled 'Monasticon Anglicanum.' These are now deposited in the British Museum. Mr. Peck died July 9, 1743.

PE'CORA, the name given by Linnæus to his 5th order of *Mammalia*, and thus defined by him in the 'Systema Naturæ:'—

Lower incisors numerous; no upper incisors. Foot hoofed, bisulcate. Food by plucking up plants to be ruminated. Ventricles four: the Rumen for macerating and ruminating. The Reticulum cancellated and recipient. The Omasus manifolded and consuming. The Abomasus banded, ascescent, &c.

In the body of the work the definition is—No upper incisors; six or eight lower incisors, very remote from the molars. Feet hoofed. Mammæ inguinal. The genera composing the order are—*Camelus*, *Moschus*, *Cervus*, *Capra*, *Ovis*, and *Bos*. The *Pecora* stand between the orders *Glires* and *Belluæ*.

PECQUET, JEAN, was born at Dieppe in 1622. He studied medicine at Montpellier; and while a pupil there in 1647, he made the discovery, for which he is chiefly celebrated, of the receptaculum chyli and the thoracic duct. He afterwards went to Paris, and continued his researches on the lymphatic system, and showed that the lacteals do not, as had been imagined, terminate in the absorbent glands, or the liver, or the spleen, but in the receptacle which he had discovered; and that their fluid is thence transmitted by the thoracic duct to the left subclavian vein. His discovery added important confirmation of the Harveian account of the circulation. Pecquet died in 1674.

PECTIC ACID. PECTIN. *Pectin* may be obtained from many fruits by pressure and evaporation. It is a gelatinous substance resembling isinglass, scarcely soluble in water, and having no acid properties. *Pectic Acid* may be obtained by the action of carbonate of potash on pectin; it is a colourless jelly, slightly acid, and but little soluble in water. It consists of $C^{11} H^7 O^{10}$.

PECTINA'RIA, Lamarck's name for a genus of *Amphitritidæ*, Cuvier's fourth family of his *Annelides Tubicoles*, the first order of his *Annelidæ*. The *Amphitritidæ* of Lamarck form the third family of his division of *Sedentary Annelids*, the others being the *Dorsalidæ*, the *Maldanidæ*, and the *Serpulidæ*. Lamarck's *Amphitritidæ* contain the genera *Pectinaria*, *Sabellaria*, *Terebella*, and *Amphitrite*. They are found on the sea-coasts of temperate and warm climates.

PECTINIBRANCHIA'TA, Cuvier's sixth order of Gastropods. The sexes are separate. The respiratory organs consist nearly always of branchiæ composed of lamellæ united in the form of combs, and are concealed in a dorsal cavity widely opened above the head. The *Pectinibranchiata* are nearly all furnished with turbinated shells, the aperture of which is sometimes entire, sometimes notched, sometimes canaliculated, and most frequently capable of being more or less closed by an operculum attached to the foot of the animal posteriorly.

This order forms the most numerous division of gastropods, comprehending nearly the whole of the spiral univalves, and many with shells simply conical. Their branchiæ, composed of numerous leaflets or fringes ranged in parallel order like the teeth of a comb, are attached, on one, two, or three lines (according to the genus), to the ceiling (plafond) of the pulmonary cavity, and which opens by a great solution of continuity between the edge of the mantle and the body. Two genera only, *Cyclostoma* and *Helicinia*, have, in lieu of branchiæ, a vascular network covering the plafond of a cavity in other respects similar: these are the only genera that respire air directly; all the others respire water.

All the *Pectinibranchiata* have two tentacles, and two eyes, carried sometimes on particular pedicles, and a mouth in the form of a proboscis more or less elongated.

Their tongue is armed with small hooks, and wears down the hardest bodies by slow and repeated friction. [ENTOMOSTOMATA.]

PECTINIDÆ, an extensive family of *Monomyarian Conchifera*, or Bivalve Mollusks, including several genera, as *Pecten*, or the Scallops, *Hinnites*, *Lima*, *Pedum*, *Gryphæa* (fossil principally), *Exogyra* (fossil only), *Ostrea*, or the True Oysters, *Placuna*, or the Translucid Oysters, *Placunanomia*, and *Anomia*. [CONCHIFERA; OYSTERS.]

PECULIARS, COURT OF. [ECCLESIASTICAL COURT.]

PEDAL. In musical instruments Pedals are of two kinds:—1, those keys which are acted on by the feet of the performer; 2, the levers acting on the swell of the organ, and on the stops; and also those of the piano-forte and harp.

PEDAL BASE (or *Pedale*), in music, is a base which remains stationary on one note, while the other parts continue moving and forming various chords, all of which, however, must be related to the holding note, according to the laws of harmony.

PEDALIACÆ, a small natural order of monopetalous Exogens, very nearly related to the *Verbenaceæ*. They are all exotic tropical herbaceous plants, and are of little known use, with the exception of the genus *Sesamum*, whose seeds afford a bland oil, not inferior, when fresh, to that of the olive.

PEDICULA'RIS, a genus of plants belonging to the natural order *Scrophularineæ*. *P. palustris* is found in marshes and wet meadows, particularly in the north of England, and is said to be injurious and disagreeable to cattle. *P. sylvatica* is found on wet, heathy, and rather hilly grounds in Siberia, Europe, and Great Britain. It is injurious to the sheep that feed on it.

PEDI'CULUS, according to Linnæus, a genus belonging to the *Insecta Aptera*. These insects, commonly called lice, form the order *Anoplura* of Dr. Leach, and *Parasita* of Latreille, so called from their parasitic habits, many mammals, if not all, and perhaps all species of birds, being infested by them; each species of bird and mammal, it would appear, having its own peculiar species of louse, and sometimes even two or three distinct species.

Three species of lice are said to infest the human subject: the *P. humanus*, which inhabits the bodies and garments, and is known by the name of the Body-Louse; the *P. cervicalis*, or *P. humanus capitis* of De Geer, which inhabits the head of man, and particularly children; and, lastly, the *P. pubis* of Linnæus, which constitutes Leach's genus *Phthirus*. This species inhabits the eyebrows, &c., and is commonly known by the name Crab-Lice.

The Linnæan genus *Pediculus* is now subdivided so as to constitute several genera, as *Pediculus*, *Phthirus*, *Hæmatopinus*, *Nirmus*, *Ricinus*, &c.

PEDIGREE. A pedigree is a tabular view of the members of any particular family, with the relations in which they stand to each other; together, usually, with some slight notice of the principal events of the life of each, as the time and place of birth, marriage, death, and burial, the residence, the profession, or rank of the principal person named in it, and public offices held by him. Sometimes these are accompanied by reference to evidence of the fact stated, as to inquisitions, parish-registers, monumental inscriptions, marriage-settlements, and deeds of all kinds. But when there is much of this kind of information and evidence introduced, the writing is rather called a genealogy, or a genealogical history, than a pedigree.

Tabular genealogies, or pedigrees properly so called, are not of very frequent occurrence in the writings of the middle ages. But at about the beginning of the 16th century, when the College of Heralds began to pay more attention to the genealogy of the English families in reference to their claims to dignities and to the distinction which the right to armorial insignia gives, many pedigrees were compiled, and in the course of that century the heralds obtained copies of all such accounts of the English familes of any distinction as could be supplied to them, and made such accounts matter of public record by entering them in the books which contain the record of their official proceedings. The pedigrees thus collected are in the visitation books at the College of Arms, and form a vast body of this species of information highly important to those who are studying critically the biography of the distinguished persons of the English nation.

Besides this grand collection of pedigrees, there are many similar collections made by private persons, or by the heralds themselves in their private capacity. Many such collections are in the library of the Heralds' College; others are in the British Museum; others in the hands of private persons.

Since the visitations were discontinued, there has been no official and regular collection of pedigrees. But there has been a continual addition made to the pedigrees which are on record in the visitation books by the entry in the books of the Heralds' College of their pedigree by particular families. In some cases, as of peers, this is compulsory.

PEDIMENT. [CIVIL ARCHITECTURE.]

PEDLAR. The legal sense of hawker is an itinerant trader, who goes about from place to place, carrying with him and selling goods; and a pedlar is only a hawker in small wares. In the various acts of parliament which impose duties upon them and regulate their dealings, they are always named in conjunction as hawkers and pedlars; and no distinction is made between them.

The provisions by which the licenses to hawkers and pedlars are regulated are contained in the statute 50 George III., c. 41; but the collection and management of the duties on hawkers and pedlars in England have been transferred to the commissioners of the Board of Inland Revenue by the 12 & 13 Vict., cap. 1.

PEDOMETER, the name of an instrument, in the shape of a small watch, by which a person may tell what space of ground he has walked or ridden over. The instrument is so constructed that when the body of the traveller is raised, either by the spring of his foot or the motion of his horse, a lever is made to act upon the wheel-work of the instrument, and an index or hand on the dial-plate points to the figures which denote the number of miles passed over.

PEDRO, DON, Emperor of Brazil and King of Portugal, was the son of John VI., King of Portugal, and was born at the Castle of Queluz, Oct. 12, 1798. At the age of nine, he accompanied his father, then regent for the Queen Maria Isabella, in their exile to Brazil. At the general peace of 1815 he was contracted in marriage with Maria Leopoldina, archduchess of Austria. At that period the colony of Brazil was raised to the rank of a kingdom, and when, in 1820, John VI. was recalled to Portugal by the Cortes, Don Pedro remained as regent in that country. When the Cortes of Portugal first began to invade the privileges of Brazil, Don Pedro placed himself at the head of the popular opposition. Civil war was the consequence, and Don Pedro was proclaimed protector and perpetual

defender of Brazil; and, finally, its independence being declared, he was proclaimed Emperor Oct. 12, 1822. To various causes of discontent another was added by the death of John VI. in March, 1826, and the consequent succession of Don Pedro to the crown of Portugal. This event excited fears lest Brazil should again become reduced to the position of a dependancy of Portugal. These fears however he endeavoured to dispel by abdicating the crown of Portugal in favour of his daughter Donna Maria da Gloria, reserving to himself the regency, with the title of king, during her minority. The succeeding years of his reign were marked by continual disturbances of a political nature throughout the country. In 1830 the French revolution gave a new impulse to the democratical party, and an affray which took place April 6, 1831, determined Don Pedro upon abdicating the throne in favour of his son, to whom, being under age, he appointed a guardian, and the following day he left the country. The throne of Portugal, which Don Pedro had resigned in favour of Donna Maria, had been usurped by his brother Don Miguel, whom in 1827 he had appointed regent of the kingdom. A civil war ensued, which terminated May 26, 1832, when Don Miguel was reduced to the necessity of signing a convention, which left the young queen in quiet possession of the throne of Portugal under the regency of Don Pedro. The acts of his short administration should have secured for him the good will of the more liberal party in his dominions. He strengthened the external relations of Portugal by a close alliance with England and France, and he confiscated for the use of the state the property of the numerous monastic establishments in his kingdom. The anathemas of the Vatican were the natural result of these sweeping measures, and they were soon followed by his own excommunication. In September, 1832, the declining state of his health compelled him to resign the regency, and his daughter was placed in full possession of the royal authority. He died Sept. 24, 1834.

PEDUNCLE is that part of a plant which is called the stalk of the flower; it is not however like the petiole with respect to the leaf, a component part of the flower, but is in reality a branch, usually of an ephemeral nature.

PEEBLESSHIRE, or TWEEDDALE, a county of Scotland, bounded N. by Edinburghshire, S. by the shires of Selkirk and Dumfries, E. by those of Selkirk and Edinburgh, and W. by Lanarkshire. It is situated between 55° 24′ and 55° 50′ N. lat., 2° 45′ and 3° 33′ W. long. Its greatest length from N. to S. is 30 miles, and greatest width from E. to W. rather less than 22 miles. The area is 338 square miles. The population in 1841 was 10,499.

Surface and Rivers.—The general elevation of Peeblesshire exceeds that of any other county in the south of Scotland. The least elevated part is near where the Tweed crosses the E. boundary, which is between 400 and 500 feet above the sea-level. The most mountainous parts extend from the S.E. to the S.W. extremities of the county. On the N.E. a lofty ridge of mountains separates this country from Edinburghshire; and on the N.W. it is separated from the same county by the Pentland Hills. The principal elevations are Hartfell (2635 feet), and Broadlaw (2741 feet), in the parish of Tweedsmuir. The hills and mountains in this parish afford good pasturage for sheep and black cattle.

The Tweed, the only river of the county, takes its rise from a spring in the upper part of the parish of Tweedsmuir, situated 1500 feet above the sea-level, and upon the same hill from whose base issue the rivers Clyde and Annan. Its course within the county is N.E. by N., until it reaches the town of Peebles, after which it is nearly due E., crossing the counties of Selkirk and Roxburgh; and after separating Berwickshire from Northumberland, it falls into the German Ocean about half a mile below the town of Berwick, and about 100 miles from its source. In the first 20 miles of its course it descends through a height of 1000 feet. The numerous rivulets which intersect the county are all tributaries of the Tweed. The chief of these are the Lyne, which rises in the Pentland Hills, and gives its name to the town and parish of Linton; the Peebles or Eddlestone, which falls into the Tweed at the town of Peebles; the Leithen; the Manner; and the Quair, which last falls into the Tweed near the seat of the Earl of Traquair. From the hilly character of the country through which they flow these rivers are subject to sudden inundations, which sometimes occasion considerable injury to the adjoining lands. Most of these streams, and particularly the Manner, contain, during the season, both salmon and trout. Eddlestone Loch is a small lake in the north-east part of the county, from which the South Esk takes its rise. It abounds with pike, perch, and eels, and is the resort of large flocks of wild fowl during summer. The climate is keen, but less severe than that of Edinburgh. The fogs so often met with in the Lothians seldom extend into this county.

Geology and Agriculture.—The prevailing rock is whinstone, of which there are some excellent quarries in the vicinity of the town of Peebles, and from which the town has been chiefly built; but that which is found in other parts is, from its laminated structure, unsuitable for building. The village of Innerleithen is much frequented on account of the water of a spring, which has long been celebrated for the cure of old wounds, diseases of the eyes, and other complaints. Lord Traquair, the proprietor of the village, has erected a neat and commodious building, whence the waters are now supplied to the visitors.

According to the 'New Statistical Account of Scotland,' the land in the county under cultivation, or occasionally cultivated, does not exceed one-seventh. The chief hindrances to improvement are—the non-residence of the proprietors; the distance from markets, coal, and lime; and to these may be added strict entails, which fetter both landlord and tenant.' Planting is on the increase, and improvements in agriculture meet with ready adoption. The black-faced sheep were exclusively reared till the commencement of the

present century. Since then the Cheviot breed has been introduced, and has increased so rapidly, that even in the most exposed situations their number now exceeds that of the other kind.

Divisions, Towns, &c.—The county is divided into 16 parishes. One member is returned to parliament for the county.

Peebles, the county town, is situated in a valley on the N. bank of the Tweed, at the confluence of the Eddlestone Water with that river. It is 20 miles due S. from Edinburgh and 42 E. by S. from Glasgow. It became at an early period the summer residence and place of rural amusement of the Scottish kings, and particularly of Alexander III. David II., in 1367, created it a royal burgh. In virtue of this title it afterwards returned a member to parliament, in union with the burghs of Lanark, Linlithgow, and Selkirk, down to the passing of the Reform Act, by which its elective franchise is merged into that of the county. The town was exclusively situated to the westward of the Eddlestone till 1545, when, having been burnt by the English, a new town was commenced on the opposite bank. A provost, 2 bailiffs, dean of guild, treasurer, and 12 councillors constitute the town-council.] The parish church, a substantial stone-building, was erected in 1784. St. Andrew's Cathedral, which was formerly used as the parish church, but of which only a small portion is now standing, was a very elegant edifice.

The bridge, which here crosses the Tweed, consists of five stone arches in the channel of the river, and three arches on dry ground. Since 1834 it has been widened, at an expense of 1000*l*. Population of the town, 1898.

The only antiquities in the county are the ruins of castles or towers, erected upon the banks of the Tweed and its tributaries to oppose the inroads of the English. One of these, the castle of Needpath, during the conflict between Charles II. and Cromwell, made a very stout resistance against the forces of the latter. Another, in the parish of Broughton, is called, for reasons unknown, the Castle of Macbeth.

PEEL. [MAN, ISLE OF.]

PEEL, SIR ROBERT, the first baronet, was born April 25, 1750, at Peel's Cross, near Lancaster, a small property belonging to his father, Mr. Robert Peel, whose third son he was. The family, though not wealthy, appears to have been of some respectability for several generations. The subject of this notice was brought up to the cotton trade, in which he made his fortune by his general ingenuity and sagacity, by his unremitting activity and attention, by his comprehensive boldness of enterprise, and by his admirable conduct of business, alike in its largest scope and in its minutest details.

In 1778 Mr. Robert Peel entered into partnership with Mr. Yates, in an extensive manufactory at Bury, in Lancashire, and his career from this time was one of great and uninterrupted prosperity. He appears to have first come forward as a politician in 1780, by the publication of a pamphlet entitled 'The National Debt productive of National Prosperity.' In 1783 he married Ellen, daughter of Mr. Yates. In 1790 he was returned to parliament as one of the members for Tamworth, in and near which borough he had acquired large property; and from the moment he entered the House of Commons, in which he sat for the same borough, in seven successive parliaments, or to the end of the reign of George III., he was a steady and zealous supportor of the government. He was created a baronet, Nov. 29, 1800. He died at his seat of Drayton Park, in Staffordshire, May 3, 1830.

In 1805 he had married a second wife. By his first wife, who died Dec. 28, 1803, he had 6 sons and 5 daughters; the eldest of the sons being the present Sir Robert Peel. Besides his large landed property, which he entailed upon his eldest son, together with, it is supposed, near half a million in money, he left about 150,000*l*. to each of his younger sons, and above 50,000*l*. to each of his daughters. He had also previously advanced to or settled upon his several children above 240,000*l*., besides an income of 9000*l*. per annum secured to his eldest son.

PEELE, GEORGE, is supposed to have been a native of Devonshire, and to have been born not later than 1552 or 1553. In 1564 he was a member of Broadgates Hall, now Pembroke College, in Oxford: he took his degree of B.A. in 1577, and was made M.A. in 1579. In no long time afterwards he appears to have removed to London, and to have become a literary adventurer. Though the particulars of Peele's career are but very imperfectly known, there is evidence enough to show that it was not only unfortunate but disreputable. He was dead in 1598, when Meres, in the second part of his 'Palladis Tamia,' described his death as having been caused by his debaucheries. He was professionally an actor. His earliest known drama was printed in 1584. In 1828 Mr. Dyce published an excellent edition of 'The Works of George Peele, with some Account of his Life and Writings,' 2 vols., post 8vo.

PEERS OF THE REALM. This term is equivalent to Peers of Parliament, that is, those noblemen who have a seat in the House of Lords. The 'Realm,' that is, the 'Roiaume,' is the Kingdom of England. Scotland and Ireland have also their Peers; but those who are simply peers of Scotland and Ireland are not Peers of the Realm, or Peers of Parliament, or Peers of the United Kingdom, for all these expressions are used to signify the same thing. [PARLIAMENT.]

Without meaning to decide the question whether the Lords Spiritual are strictly peers of the realm, the persons who fall under this description are the Dukes, Marquesses, Earls, Viscounts, and Barons, and this without reference to the accident of age: an earl, for instance, is a peer of the realm, *though* a minor, but he does not sit or vote in the House of Lords till he is twenty-one. Women may also be Peeresses of the realm in their own right, as by creation, or as inheritors of baronies which descend to heirs general, but they have no seat or vote in the House of Lords. The wives of peers are peeresses.

Every peer of the realm, being of full age and of sound mind, is entitled to take his seat in the

house of peers, and to share in all the deliberations and determinations of that assembly. If peers of the realm are charged with any treason, felony, misprision, or as accessories, they are not subject to the ordinary tribunals, but the truth of the charge is examined by the peers themselves; they cannot be arrested in civil cases; they give their affirmation on honour when they sit in judgment, and answer bills in chancery upon honour; but when examined as witnesses they must be sworn.

Peers are tried for misdemeanors in the same way as other people. The lords spiritual are also, in all cases, tried by the ordinary courts. Peeresses have the same privileges as peers, whether they are peeresses by birth, creation, or marriage; but if a peeress by marriage marry a commoner, she loses her privileges.

The crown may at its pleasure create a peer, that is, advance any person to any one of the five classes; which is now done either by writ or patent. A peer cannot be deprived of the dignity or any of the privileges connected with it, except on forfeiture of the dignity by being attainted for treason or felony; and the dignity must descend, on his death, to others, as long as there are persons within the limitation of the grant, with all the privileges appurtenant to it. A pension has sometimes been settled by Parliament on a person, at the time when he has been made a peer. The pension is granted by the Parliament on the recommendation of the crown.

PEEWIT. [PLOVERS.]

PE'GASUS, one of the old constellations, called by Aratus (and also by Hyginus) simply the Horse. The mythological accounts of Pegasus (a son, it was said, of Neptune and the Gorgon Medusa, though how, with such parentage, he came to be a horse is not stated), are more than usually unconnected, and the constellation is not a whole horse, but only the head, fore-legs, and shoulders, to which a pair of wings is attached; nor is there any fountain near the place, except that with which Aquarius feeds one of the fishes. The figure of Pegasus is inverted, the head being farther from the North Pole than the body. The constellation is surrounded by Cygnus, Equuleus, Aquarius, Pisces, and Andromeda. There are three bright stars, α (or Markab), β (or Scheat), γ (or Algenib), which form a rectangular figure with α Andromedæ, such as cannot be mistaken when the latter constellation is known. Moreover, a line drawn through α and β points to the pole star, in a line which produced passes through the pointers of the Great Bear.

PEGU, is a country in Eastern Asia, which extends on both sides of the river Irawaddy, from its mouth to the Galladyet Mountains (from 16° to 18° 30′ N. lat.), and from the banks of the Saluen River to the mountains of Arracan. It was a powerful kingdom a century ago, but now forms part of the Birman Empire. The former capital, *Pegu*, contains many interesting structures. It is situated about 17° 40′ N. lat. and near 96° E. long., and is built on the eastern banks of a navigable river, which, about 90 miles below the town, joins the eastern or Syriam island branch of the Irawaddy about three miles below the town of Rangoon.

PEINE FORTE ET DURE. The 'strong and hard pain,' which is denoted by these words, was a species of torture used by the English law to compel persons to plead, when charged with crimes less than treason, but amounting to felony. It was applicable whenever the accused stood mute on his arraignment, either by his refusal to put himself upon the ordinary trial by jury, or to answer at all, or by his peremptorily challenging more than twenty jurors, which was a contumacy equivalent in construction of law to actually standing mute. This practice was discontinued in consequence of the statute 12 Geo. III. cap. 20, which provides that every person who shall stand mute when arraigned for felony or piracy shall be convicted of the same, and the same judgment and execution shall be awarded against him as if he had been convicted by verdict or confession.

PEIRÆUS. [ATHENS.]

PEIRESC, NICOLAS CLAUDE FABRI DE, a councillor of the parliament of Aix, was born at Beaugensier, in Provence, Dec. 1, 1580. His father was a councillor of the court of aides. He received his earliest education among the Jesuits at Avignon, whence he was removed to Aix in 1595. He came to England in 1606, and visited Oxford, where he made the acquaintance of Camden, Sir Robert Cotton, and other learned men.

He became highly distinguished as an antiquarian, and was a patron of letters. He died June 24, 1637, and left behind him, besides some of his own composition, a great number of manuscripts, ancient and modern, on local history and antiquities, mathematics, astronomy, the medallic science, languages, &c. A catalogue of these, in number more than 700, is preserved among Sir Hans Sloane's Manuscripts in the British Museum. A few of his writings have been published.

PE'KEA is the name given by botanists to a plant inhabiting Guiana, and furnishing the Saouari Nuts of the shops. The shell is brownish and rugged, and contains a kernel of a soft consistence, and of the most delicate buttery quality. It is by far the best of the South American nuts that are brought to England, and much superior to our own walnuts and filberts.

PEKING, the capital of the Chinese Empire, is situated in 39° 59′ lat. and 116° 28′ E. long., in a level plain. It is about 80 miles distant from the Great Wall.

The city consists of three parts: the Zin-Tcheou, or City of the Throne; the Wnilo-Tcheou, or External Town; and twelve suburbs. The first is also called the Town of the Tartars, as the inhabitants are of Mongol or Mantchoo extraction; and the second, the Town of the Chinese, being entirely inhabited by Chinese. These two cities are inclosed by walls, the circumference of which is 58 li, or about 17 English miles. The suburbs extend on the east, south, and west of the walls. The walls are about 40 feet in height, by 20 in thickness; they are embattled, and flanked by strong towers. Sixteen gates lead to the town.

Over each gate is a watch-tower, nine stories high, and in each story are port-holes for cannon.

The roads leading to the city are paved with blocks of granite; the streets are not paved, but are constantly watered to keep down the dust. The principal streets vary from 140 to 200 feet in breadth, but they contain no large buildings; the houses are usually not higher than one story, and few have two stories. The streets are lined with a continuous series of shops. Public edifices and also the dwelling-houses of private persons occur only in the narrow streets and lanes.

This large city has no navigable river; but there are numerous wells, and a narrow canal flows through the city.

The Zin-Tcheou, or City of the Throne, consists of three parts, inclosing one another. In the centre is the imperial palace, called Zun-Zin-Tcheou, a vast assemblage of buildings; around this is the Kuan-Tcheou, the Imperial Town, which is seven miles and a half in circumference; and exterior to this is the City of the Throne, or Zin-Tcheou, in which the university buildings are situated. The Wailo-Tcheou, or Town of the Chinese, is properly only a suburb, and has been inclosed with walls only on account of the two principal altars which it contains, and on which the emperor presents his offerings. In this part of Peking are the theatres, baths, &c.

The population of Peking is estimated by Balbi at 1,300,000.

PELAGIANISM. The disputes in the earlier centuries of the Christian church related to the fundamental dogma of the Trinity. The Catholic doctrines on this head having been stated and enforced by the leaders of the Eastern church, a succession of controversies arose, of a blended dialectic and practical nature, and, for this reason, equally fitted to occupy the attention of the principal intellects of the West. Such were the questions respecting grace, election, and predestination.

Pelagius was born during the fourth century, in Britain. He settled in Italy as a monk, and began to disseminate his peculiar doctrines in Rome, about the year 400. Accompanied by his friend and admirer Cælestius, Pelagius visited Africa and Palestine. After escaping censure from the council of Diόspolis, he was subsequently condemned by Pope Zosimus (who had hitherto protected Cælestius), and banished from Italy by an edict of the Emperor Honorius, in 418. It is supposed that on his expulsion from his retreat in Palestine, which he was induced to select from the similarity of his own views with those of the Eastern church, he retired to his native country. Very little of his writings has come down to us.

Though fully alive to the deadly evils of Antinomianism, he fell into an error equally pernicious, when he proposed to preach, as an antidote, the limitation of the sin of Adam (in its consequences) to himself, and the power of man to 'do good works pleasant and acceptable to God,' so as to merit eternal happiness, without the aid of divine grace. Not merely the culminating points of the system of Augustin, the doctrines of irresistible and absolute predestination, were repudiated by Pelagius, but the fundamental doctrines of the gospel, those of the necessity of pardoning mercy and sanctifying grace, were degraded from their proper rank in the Christian scheme, and the Atonement deprived of its essential virtues.

Differing so widely as did the systems of Pelagius and his great antagonist St. Augustin, it was not difficult to foresee that attempts at compromise would hardly be successful. The first attempt to reconcile these contradictory dogmas was made at Marseille. Its supporters were consequently designated as Semi-Pelagians. They agreed with St. Augustin, in that they ascribed generally a holy life as such to the grace of God; but on the other hand, they approached more nearly to Pelagius, as they attributed the beginning and end, or the commencement and sum of a course of acceptable actions to the force of human merit.

The modern Arminians, called also in the first instance Remonstrants, and in more homely phrase, Free-Willers, correspond very nearly in doctrine with the Semi-Pelagians above mentioned.

PELAGIUS I. II. [Popb.]

PELAGONIA. [Macedonia.]

PE'LAMYS, Daudin's name for a genus of Marine Ophidians, found in the seas of warm climates. Dr. Cantor, in his 'Observations on Marine Serpents,' enters into the distinguishing anatomical characters, habits, and general conformation of this group, with reference to the element in which they exist. But little attention has hitherto been given to them, on account of the danger of examining them alive, and also from their geographical position being entirely confined to the tropical seas. Dr. Cantor was stationed on the delta of the Ganges, and had, for a considerable period, very favourable opportunities of studying these ophidians, many of which were taken in the nets of the fishermen. The principal physiological point of interest established, is the highly venomous character of all the species without exception, a fact denied by Schlegel, who states them to be harmless, an erroneous idea which is also current among the natives. Dr. Cantor gives fatal proof of this error in the death of an officer in Her Majesty's service, within an hour or two after the bite of a serpent which had been caught at sea; and from numerous experiments conducted by himself, the result of which was, that fowls, fish, and other animals, invariably died within a few minutes after the bite had been inflicted. (*Zool. Proc.* 1838.)

PELARGO'NIUM is the name given by botanists to the gaily-painted flowers which are usually called *Geraniums* in our greenhouses. There is a large number of genuine species of this genus, chiefly inhabiting the Cape of Good Hope; and as these intermix very readily, producing in great abundance shrubs which are capable of being perpetuated by cuttings, a prodigious number of spurious species, as well as acknowledged varieties, have found their way into the writings of systematic botanists.

By care and attention to a few simple points of practice, these plants may be cultivated and mul-

tiplied by any one who has a greenhouse, and hence they have become universal favourites. Those points are the following, namely: 1, water; 2, warmth; 3, a gentle bottom heat; 4, abundance of air; 5, as much light as the leaves will bear; and 6, a rich soil during the season of growth, and a cool atmosphere, less water, abundance of light, and close pruning afterwards.

PELASGI (Πελασγοί) were the most ancient inhabitants of Greece, as far as the knowledge of the Greeks themselves extended. The Greek traditions represent the Pelasgic race as spread most widely over almost all parts of Greece and the islands of the Grecian Archipelago. The western coast of Asia Minor was also inhabited by Pelasgi; and they were also widely spread over the south of Italy. The relationship between the Hellenic and Pelasgic race is one of those obscure questions on which it is difficult to throw much light; but it seems probable that the Pelasgic and Hellenic tongues were dialects of a common language. Those massive structures, which exist in some parts of southern Europe, and are usually called Cyclopean, are probably Pelasgian. The whole of Hellas, according to Herodotus (ii. 56), was originally called Pelasgia.

PELA'YO, first King of Asturias, was the son of Favila, duke of Cantabria, and a descendant of Chindaswind, the twenty-eighth in order among the Gothic kings of Spain. After the disastrous battle of Guadalete (A.D. 711), all those Christians who either feared the cruelties of the Moorish conquerors or could not bear their yoke, fled for refuge to the mountains of the Asturias, where Pelayo was appointed their chief. He defeated the Moors in several important battles. The important city of Leon was reduced (722), as well as Zamora, Lugo, and Astorga, and although the Mohammedans in 724 recovered some of these places, the intestine wars in which they themselves were engaged, and the repeated incursions of Pelayo, helped to consolidate the little kingdom which the Asturian hero transmitted to his successor Alonso el Casto. The remainder of Pelayo's reign is unknown. He died in 737.

PELECA'NIDÆ, Dr. Leach's name for a family of natatorial or swimming birds, comprehending the Pelicans, Cormorants, Darters, &c.

'In the birds of this family, with the exception of the Tropic-Birds, the cheeks, throat, and parts about the base of the bill are more or less denuded of feathers. The skin of the throat is very dilatable; the tongue is small, and the nostrils are mere slits not easily distinguishable. The beak is long, but varies in form. All the toes are united by webs, the hind toe having an oblique direction inwards, instead of being completely directed backwards. Notwithstanding this form of the foot, and this position of the hind toe, with an ample web connecting it to the innermost of the anterior toes, the birds perch with facility on trees, and in the Gannets we find the claw of the middle toe serrated. Wings ample; flight rapid and enduring; the air-cells of the body are amazingly extensive.' 'Museum of Animated Nature.'

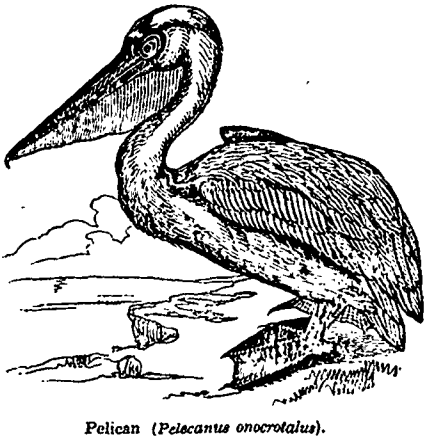
Mr. G. R. Gray, in his 'List of the Genera of Birds, with an Indication of the Typical Species of each Genus' (London, 1840), makes the *Pelecanidæ* the sixth and last family of the *Palmipedes*, and separates it into the sub-families *Plotinæ*, *Phaetoninæ*, and *Pelecaninæ*. The last subfamily consists of the genera *Sula*, *Onocrotalus*, *Pelecanus*, *Phalacrocorax*, and *Fregata*.

We may here notice the following genera:—

Genus I., *Pelecanus*. The true Pelicans are large and heavy birds, with a great extent of wing, and are excellent swimmers. The expansive pouch, whose elasticity is well known to all who have witnessed the shapes into which it is stretched and formed by the itinerant showman, will hold a considerable number of fish, and thus enables the bird to dispose of the superfluous quantity which may be taken during fishing expeditions, either for its own consumption or for the nourishment of its young. In feeding the nestlings—and the male is said to supply the wants of the female when sitting in the same manner,—the under mandible is pressed against the neck and breast, to assist the bird in disgorging the contents of the capacious pouch, and during this action the red nail of the upper mandible would appear to come in contact with the breast, thus laying the foundation, in all probability, for the fable that the Pelican nourishes her young with her blood, and for the attitude in which the imagination of painters has placed the bird in books of emblems, &c., with the blood spirting from the wounds made by the terminating nail of the upper mandible into the gaping mouths of her offspring.

The neighbourhood of rivers, lakes, and the sea-coasts are the haunts of the Pelicans, and they are rarely seen farther than twenty leagues from the land. They appear to be, to a certain extent, gregarious.

The species are widely spread (Europe, Asia, Australia, Africa, and America), though not numerous: two are European, *Pelecanus onocrotalus* and *Pelecanus crispus*.



Pelican (*Pelecanus onocrotalus*).

For notes on the Anatomy of the Pelican, see 'Zool. Proc., 1835.

Genus II., *Phalacrocorax* (*Halieus*, Illiger; *Carbo*, Meyer; *Hydrocorax*, Vieillot). The species of sea-birds contained in this genus are rather numerous, and are dispersed over every portion of the globe. Mr. Gould describes six Australian species ('Birds of Australia'). They are known by the names of Cormorants or Corvorants (*Corvus vorans*) and Shags.' Two species are British, namely the Common Cormorant (*Phalacrocorax Carbo*), and the Crested Shag, or Green Cormorant (*Phalacrocorax cristatus*). As a type of the genus, the Common Cormorant may be taken.

There is little or no doubt that this is the κόραξ (corax) of Aristotle ('Hist. Anim.,' viii. 3), whose description of the bird and of its habits agrees well with that now before us. It is the *Corvo Marino*, *Corvo Aquatico*, *Marangone*, *Mórangone*, and *Mergone* of the Italians; *Cormorant* (Belon) and *Cormoran* of the French; *Scharbe* and *See-Rabe* of the Germans; *Corvorant* and *Cormorant* of the British. It is the *Corvus Aquaticus* of Gesner, Ray, and others; *Pelecanus Carbo* of Linnæus; *Phalacrocorax Carbo* of Cuvier and others; and *Carbo Cormoranus* of Meyer and others.

The geographical distribution is very extensive. The species is an inhabitant of the New as well as the Old Continent. In the latter it is widely diffused. It is spread over a considerable portion of Europe, especially the north. Temminck notices it as very abundant in Holland in all seasons, as common in England and France, but rare in Germany and the south. It appears in the 'Geographical List' of the Prince of Musignano as an inhabitant of Europe generally and of America.

The Cormorant swims very low in the water; even in the sea the body is deeply immersed, little more than the neck and head being visible above the surface. It is a most expert diver, pursuing the fish which form its food with great activity under water. It is said to be very fond of eels. It flies with the neck outstretched, and may be often seen drying its drenched plumage on the shore or on insulated rocks. It perches on trees, where it is occasionally known to build its nest, but it mostly selects rocky shores and islands, choosing, according to Selby, the summits, and not (like the Green Cormorant) the clefts or ledges. The author last quoted states that upon the Fern Islands its nest is composed entirely of a mass of sea-weed, frequently heaped up to the height of two feet, in which are deposited from three to five eggs of a pale bluish-white, with a rough surface. The young, when first hatched, are quite naked and very ugly, the skin being of a purplish-black; this in six or seven days becomes clothed with a thick black down, but the feathered plumage is not perfected in less than five or six weeks. On being thrown into the sea, even when scarcely half fledged, they immediately plunge beneath the surface, and endeavour to escape by diving. This they will do to a great distance, using their imperfect wings, and pursuing their submarine flight in the same manner and almost with as much effect as their parents.

Formerly in our island (and the practice is not quite obsolete), Cormorants were trained to catch fish and land them, as hawks and falcons were trained to pursue their aërial quarry; and they appear to have been extremely docile. An account of this is quoted by Willughby from Faber. Cormorants have been long used in China for the purpose of fishing, as related by Sir George Staunton ('Embassy to China').

The Cormorants on the south coasts of England are very large. Pennant relates that he weighed a bird of this species that exceeded seven pounds; the length was three feet four inches; the extent four feet two.

Genus III., *Plotus*. (*Anhinga*, Brisson; *Plotus* of Scopoli; and *Ptinx* of Mœhr.) This genus contains a limited number of species, known as Darters, or Snake-Birds. None are European. One is African. Another is found in America (Carolinas, Georgia, Florida, Brazil, and Guiana). Another is Australian.

These extraordinary birds are well described by Buffon when he says, 'The Anbinga offers us a reptile grafted on the body of a bird.' Those who have seen the long neck, and that only, issuing from the water, twisting about above the herbage and among the foliage, say that a casual observer might well take it for a snake. Vaillant states that the neck of the species seen by him in Africa was always in oscillation when the bird was perched; and that any one who saw its tortuous movements among the foliage, the body being concealed, would take it for one of the tree-serpents. The form indeed was considered by the older voyagers as a monster partaking of the nature of the snake and the duck; and Wilson states that in some ancient charts which he had seen, the creature was delineated with all the extravagance of fiction. In flight the neck is stretched out, immovable, in a line with the body.

The *Plotus Levaillantii* is a native of Senegal, Southern Africa, a part of the coasts of Asia, and of the islands of Java and Sumatra. It is well described by Le Vaillant.

The *Plotus Anhinga* is described by Bartram, Wilson, Audubon, &c. These birds frequent rivers and sheets of water, creeks, &c. They swim with the body submerged; pursue fish under water; and breed upon trees or rocks close to the element which supplies them with food.

The *Plotus Novæ Hollandiæ* is described and figured by Mr. Gould.

Genus IV., *Fregata*, Ray (*Tachypetes*, Vieillot). The only known species of this genus, the Frigate, or Man-of-War Bird (*Tachypetes Aquilus*), is remarkable for its powers of wing, and its raptorial habits, emulating the eagle-tribe in ferocity, and perhaps excelling all birds in buoyancy and ease of flight. It equals the Common Kite in size, but excels that bird in the span of its wings.

Mr. Vigors ('Linn. Trans.,' vol. xiv.), who considers *Phaeton* and the genus before us as belonging to this family, observes that in these genera we find a still more immediate approach than we find in the closely-allied cormorants to the birds of prey, in their raptorial habits, their soaring and aërial flight, and the rapid seizure of their

prey without immersing themselves in the waters where they seek it. '*Tachypetes* in particular,' says Mr. Vigors, 'exhibits in its general habits and structure the most conclusive evidence of this affinity, and of its deviation at the same time from the *Natatores*. Although for the most part it pursues its habits of rapine at immeasurable distances from the shore, and derives its support exclusively from the ocean, it is never known to rest upon its surface. It does not possess in fact, to a sufficient extent, those glands which by their oily secretions preserve the plumage of other oceanic birds from the effects of the water; while the extreme disproportion of its hinder extremities deprives it of the power of either swimming or walking. On observing the structure of its legs, we immediately detect this deficiency. Short, weak, and feathered down to the toes, they are equally unsuited to the land and the water. Its powers of motion and the characters by which it maintains its station in nature are in fact centred in its wings. Supported in its unlimited flights by the strength and expansion of these members, and aided by the singular mechanism of its tail and the buoyant nature of the inflated sac which distends its throat, it seems to be an inhabitant of the air rather than of the land, where it resorts alone for the duties of its nest, or of the water, over which it only hovers for its prey.'

This species is common in the warmer latitudes of the Atlantic and Pacific Oceans. Flying-fishes and others which swim at the surface of the water are its prey; and it constrains the gulls, boobies, and gannets, to render up their booty. The nest is said to be built on rocks in small desert islands, on lofty cliffs, or on high trees in retired situations near the sea. A good account of the habits of this bird is given by Sloane in his 'History of Jamaica.'

PELEW ISLANDS are a chain of small islands situated in the Pacific, between 8° and 9° N. lat., and between 130° and 136° E. long. They are about 20 in number, and are enclosed by a reef. A considerable part of their surface is covered with hills, between which there are pretty extensive valleys, generally with a rich soil. The hills are covered with high trees. There are no rivers in the islands, but the inhabitants are supplied with water from brooks and ponds. The produce is wholly of a tropical character.

The inhabitants are a tribe of Malays. They wear no clothes, and drink only water and the juice of the cocoa-nut and of the sugar-cane without distillation. Their huts are made in a very simple way, but they show some ingenuity in the construction of their boats. Their cooking utensils are made of clay, and are burned in the same manner as our coarse pottery.

PELICAN. [PELECANIDÆ.]

PELL, JOHN, was born at Southwick in Sussex, March 1, 1610, where his father was minister. In 1631 he was admitted to an *ad eundem* degree in the university of Oxford, having proceeded to the degree of M.A. at Cambridge the previous year. During this time he had acquired a mathematical reputation by the publication of several works, and in 1642 he was chosen to fill the Mathematical Chair at Amsterdam. In 1646, on the invitation of the Prince of Orange, he removed to the new college at Breda, as professor of mathematics, with a salary of 1000 guilders per annum. In 1652 he returned to England, but in 1654 he was chosen by Cromwell to be agent to the Protestant cantons in Switzerland. He continued in Switzerland till June 23, 1658. His diaries and correspondence during this period are still preserved among the Lansdowne manuscripts in the British Museum. Having entered holy orders, he was instituted, in 1661, to the rectory of Fobbing in Essex, with the chapel of Battlesden annexed. In 1673 he was presented to the rectory of Laindon in Essex; and about the same time he took the degree of D.D. Shortly afterwards Dr. Sheldon, bishop of London, was translated to the archbishopric of Canterbury, and made him one of his domestic chaplains. In the midst of his incessant application to his studies, owing to the neglect of his affairs, his embarrassments increased, and he contracted debts, which proved the occasion of his being twice in the King's Bench prison. He died Dec. 12, 1685. Dr. Pell published the following works:—'A Refutation of Longomontanus's Discourse De Vera Circuli Mensura,' 4to., Amst., 1644. 'A Letter to Theodore Haak, concerning Easter,' 4to., Lond., 1664. 'An Idea of the Mathematics.' Printed at the end of Mr. John Durie's 'Reformer Library-Keeper.' 'A Table of Ten Thousand Square Numbers,' fol., Lond., 1672. Besides these, he published a few other works and several single-leaf controversial pamphlets. His manuscripts and letters are numerous, and perhaps in no similar instance have papers been so carefully preserved. In the British Museum alone are nearly forty folio volumes, none of them very small, of his letters and mathematical scraps.

PELLA. [MACEDONIA.]

PELLAGRA is a disease chiefly affecting the skin, and is particularly prevalent amongst the peasantry of the north of Italy. It usually appears first as a disease of the skin, breaking out early in the spring, with slightly elevated shining dark-red blotches on the hands and feet, and sometimes on other parts of the body, accompanied by a slight pricking sensation. Soon after, small tubercles arise upon the inflamed blotches, and the skin becomes dry and scaly, and often deeply cracked. Desquamation takes place, and, towards the close of the summer, or even earlier, the skin usually appears quite recovered.

In the next spring however the disease usually recurs, with a great aggravation of both the local and general symptoms, and especially with an increase of the nervous affection, and great anxiety and despondency. In succeeding years it regularly returns with increased severity in every spring, though it does not, as at first, leave the patient nearly healthy in the autumn and winter. If the disease does not prove fatal by its effects in debilitating their bodies, it generally leads to incurable idiotcy or mania. Its origin and prevalence are referred to the condition of poverty in which the peasantry are compelled to live.

The treatment of pellagra offers little prospect of success so long as the patient remains exposed to the same influences by which he was rendered subject to its attack. The course usually adopted by the Italian physicians for the patients who are admitted into the hospitals is a liberal allowance of wholesome food, and the administration of wine and of tonics of various kinds.

PELLERIN, JOSEPH, was born at Marli-le-Roi, near Versailles, April 27, 1684. He studied at Paris, and, besides the Latin and Greek languages, made himself master of the Italian, Spanish, and English. After completing his college studies, he learned Hebrew, Syriac, and Arabic. His knowledge of the three modern languages procured him, in 1706, a situation in the navy-office (bureau de la marine). After filling other situations, he became ultimately first clerk of the navy (premier commis de la marine). In 1745 bodily infirmities compelled him to retire from the public service, and he died at Paris, Aug. 30, 1782.

Pellerin, during his long service of about forty years, had used the opportunities which his situations afforded him in the collection of a considerable number of coins and medals, at first from curiosity, but afterwards from a taste for them as monuments of antiquity. To occupy his leisure and alleviate his sufferings, after his retirement, he began to read, explain, classify, and arrange them. His early studies in the oriental languages, as well as in Latin and Greek, were renewed, and became a source of much gratification to him. Such was the origin of that magnificent collection of coins and medals which he formed in the course of the subsequent forty years of his life. His descriptions of the medals, with his comments and remarks, formed a large Catalogue Raisonné, which he published under the title of 'Recueil de Médailles de Rois, Peuples, et Villes,' &c., 10 vols. 4to., Paris, 1762 to 1778. The collection, which consisted of 32,500 medals, was bought by the King of France, in 1776, for 300,000 francs. The king afterwards allowed Pellerin, as long as he lived, the use of the whole of the royal collection, which then amounted to about 44,000.

PELLITORY. [ANTHEMIS.]

PELOPIDAS, the son of Hippoclus, belonged to one of the principal families of Thebes. He distinguished himself at the battle of Mantineia (B.C. 385), in which Epaminondas saved his life, and from this time they were faithful friends. When the Lacedæmonians surprised the citadel of Thebes, and established the power of the aristocracy, Pelopidas, who belonged to the popular party, fled to Athens. In B.C. 379 Pelopidas and his party got into Thebes, put the leaders of the aristocracy to death, and Pelopidas was proclaimed commander. The Spartan governor capitulated, and gave up the citadel. In a battle near Orchómenus, Pelopidas defeated the Lacedæmonians; and they were again defeated at Leuctra (B.C. 371), where Epaminondas commanded. [EPAMINONDAS.] In B.C. 369 the two friends were appointed two of the Bœotarchs; and marched into Peloponnesus. They invaded Laconica, and took Messenia, to which country they invited back the descendants of the former exiles.

Pelopidas was afterwards sent against Alexander, the tyrant of Pheræ, whom he defeated. He was next called into Macedonia to settle disputes between the king Alexander and his natural brother Ptolomæus; and he brought back to Thebes, as a hostage, Philip, the king's brother. Some time after Pelopidas was treacherously seized by Alexander of Pheræ, but he was released by his friend Epaminondas. Pelopidas was sent on a mission to the Persian king, Artaxerxes, to support the Theban interest against the Spartan and Athenian envoys at the Persian court. Pelopidas succeeded in making a favourable treaty with the Persian king. Alexander of Pheræ was still restless, and on his return Pelopidas was sent with a force against him. With inferior numbers he met Alexander at Cynocéphalæ in Thessaly, and he had the advantage, but Pelopidas lost his life owing to his excessive daring. Pelopidas was a distinguished commander, and he and his friend Epaminondas were two of the most estimable public men of ancient Greece.

(Plutarch, *Pelopidas*; Xenophon, *Hellenica*.)

PELOPONNESIAN WAR is the name given to the great contest between Athens and her allies on the one side, and the Peloponnesian confederacy, headed by Sparta, on the other, which lasted from 431 to 404 B.C. The war was a consequence of the jealousy with which Sparta and Athens regarded each other, as states each of which was aiming at supremacy in Greece, as the heads respectively of the Dorian and Ionian races, and as patrons of the two opposite forms of government, oligarchy and democracy. A truce for thirty years had been concluded between Athens and Sparta in the year B.C. 445, but the occasion for a quarrel was presented by the affairs of Corcyra and Potidæa. War broke out between Corinth and Corcyra, respecting Epidamnus, a colony of Corcyra (B.C. 436), and the Corcyreans applied to Athens for assistance. Their request was granted, as far as the conclusion of a defensive alliance between Athens and Corcyra, and an Athenian fleet was sent to their aid, which however soon engaged in active hostilities against the Corinthians.

Potidæa, on the isthmus of Pallène, was a Corinthian colony, and even after its subjection to Athens continued to receive every year from Corinth certain functionaries or officers (ἐπίδημιοργοι). The Athenians, suspecting that the Potidæans were inclined to join in a revolt to which Perdiccas, king of Macedon, was instigating the towns of Chalcidice, required them to dismiss the Corinthian functionaries, and to give other pledges of their fidelity. The Potidæans refused, and, with most of the other Chalcidian towns, revolted from Athens, and received aid from Corinth. The Athenians sent an expedition against them, and, after defeating them in battle, laid siege to Potidæa (B.C. 432). This led to a meeting of the Peloponnesian confederacy at Sparta, in which it was declared that Athens had broken the truce, and it was resolved to take up arms against her. Thucydides (ii. 1) dates the beginning of the war

from the spring of B.C. 431. The Spartans were aided by all the Peloponnesians, except the Achæans, who joined them afterwards, and except Argos: they had also the people of Mégaris, Phocis, and Bœotia, and others, for their allies. The Athenians had on their side Chios, and Lesbos, with Samos and other islands of the Ægean; also Platæa, most of the Acarnanians, Corcyra, Zacynthus, and some of the Greek colonies in Asia Minor, Thrace, Macedonia, and the Hellespont. The resources of Sparta were in her troops, a large part of which consisted of the contingents of her allies. The Athenians were strong in their fleet, and they had larger money resources than the Spartans.

The history of this long and bloody contest was written by Thucydides, an Athenian [THUCYDIDES], who however has not left his history complete. His narrative ends in the year B.C. 411. The continuation was written by Xenophon, in his work entitled 'Hellenica.'

The war was terminated by the defeat of the Athenians at Ægospótami, on the Hellespont, by Lysander, who sailed to Athens after his victory, and compelled it to surrender (B.C. 404) on such terms as to give the ascendancy to the oligarchical party, and thus secure to the Spartans an ally in Athens instead of an enemy.

PELOPONNE'SUS (Πελοπόννησος), that is, 'the island of Pelops,' the ancient name of the Morea, derived its name from Pelops, who is said by later Greek mythologists to have been of Phrygian origin. Thucydides (i. 9) simply observes that he came from Asia, and brought great wealth with him. He married Hippodameia, the daughter of Œnómaus, king of Pisa in Elis, and succeeded to his kingdom. Agamemnon and Menelaus were descended from him.

The word Peloponnesus does not occur in Homer. The original name of the peninsula appears to have been Apia. (Hom. 'Il.,' i. 270; iii. 49.)

In the time of Thucydides (i. 10) the Peloponnesus appears to have been divided into five parts, namely, Laconica, Messenia, Argolis, Achæa, and Arcadia; but in that case, as Pausanias has remarked (v. 1, s. 1), Elis, which for many reasons ought to be made a separate division, must have been included in Achæa or Arcadia. Modern writers usually make six divisions, Achæa, Elis, Arcadia, Argolis, Laconica, and Messenia, to which Sicyonia or Corinthia is sometimes added.

The ancient history of Peloponnesus forms part of the history of Greece. The physical geography of the country is given under MOREA, ACHÆA, ARCADIA, ARGOS, ELIS, LACONICA, and MESSENIA.

PEMBERTON, HENRY, born at London in 1694, studied medicine at London, Paris, and Leyden. In 1719 the university of Leyden conferred upon him the degree of doctor of medicine. In 1728 he succeeded Dr. Woodward as professor of physic in Gresham College, London, when he commenced a course of lectures on chemistry, which were published by Dr. James Wilson in 1771, London, 8vo. At a later period he was requested by the College of Physicians, of which he was early elected a fellow, to remodel their Pharmacopœia, of which, in an improved form, he published a translation in 1746, London, 8vo. He died April 9, 1771. Besides editing the edition of Newton's 'Principia,' which appeared in 1726, he published,—'Epistola ad Amicum de Cotesii Inventis,' London, 1722, 4to.; 'View of Sir Isaac Newton's Philosophy,' London, 1728, 4to.; 'Lectures on Physiology,' London, 1733, 8vo. His communications to the Transactions of the Royal Society, of which body he was admitted a fellow in 1720, extend from vol. 32 to vol. 62.

PEMBROKE. [PEMBROKESHIRE.]

PEMBROKE COLLEGE, Cambridge, formerly called *Pembroke Hall*, was founded under the name of Valence-Mary, by Mary de St. Paul, the widow of Aymer de Valence, earl of Pembroke, in 1347, when she endowed it with estates for the maintenance of a Master, 6 Fellows, and 2 Scholars. King Henry VI. is said to have trebled the revenues of the college by bestowing on it the priory of Linton, with its appurtenances, and the rectory and manor of Soham.

The present number of foundation-fellowships in this college is 14, open to all nations, and without limitation as to counties, except that in the election to a fellowship established by Archbishop Grindal, formerly master of the college, a preference is to be given to a scholar educated at St. Bees' School in Cumberland. There are also 2 bye-fellowships.

There are 6 foundation-scholarships, 3 of which, founded by Archbishop Grindal, are for scholars educated at St. Bees' School. There are numerous other scholarships founded by different individuals, besides those on the foundation.

Pembroke Hall, situated on the east side of Trumpington Street, consists of two courts, one of which is 93 feet by 54, and the other 122 feet by 92. The hall divides the two courts. On the east side of the inner court is a detached building, erected for the purpose of containing a large hollow sphere, constructed by Dr. Long, professor of astronomy. The chapel was built by Matthew Wren, bishop of Ely, after a design by his nephew Sir Christopher Wren. It was dedicated in 1665. The number of members on the boards of the college, in 1848, was 122.

PEMBROKE COLLEGE, Oxford, was founded in the early part of the 17th century, on the site of Broadgate Hall, an ancient seminary for students of the civil and canon law. It was long known by the name of Segrim Hall, or corruptly Segreve Hall. It afterwards received the name of Broadgate Hall. It was one of the purchases which Wolsey attached to his intended college, and at the dissolution was confirmed to Christ-Church by King Henry VIII. Dr. John Budden, the last principal of Broadgate Hall, died in 1620. The new foundation took place a few years after this in consequence of a bequest of 5000*l.* from Thomas Tesdale, Esq., of Glympton in Oxfordshire, assisted by a second benefactor, Richard Wightwick, B.D., sometime of Baliol College, and afterwards rector of East Ilsley in Berkshire, who engaged to make over some estates in aid of the endowment. Pembroke College was established by letters-patent, June 22, 1624, with the desig-

nation of 'The Master, Fellows, and Scholars of the College of Pembroke, in the University of Oxford, of the foundation of King James, at the cost and charges of Thomas Tesdale and Richard Wightwick.' It received the name of Pembroke from William Herbert, earl of Pembroke, then chancellor of the university, whose interest was liberally employed in its establishment. It then consisted of 10 fellows and 10 scholars, besides the master: 10 fellowships and 6 scholarships have been since added by different benefactors; and the foundation at present consists of a Master, 20 Fellows, and 16 Scholars. Several unincorporated scholarships and exhibitions have been added at different times. The total number of members on the books of the college in Jan. 1848 was 185.

The greater portion of the buildings of Pembroke College are of a date subsequent to the foundation, but the hall is the same that belonged to Broadgate. The chapel was consecrated in 1732.

PEMBROKESHIRE, a maritime county, forming the extreme west of South Wales, is bounded E. by the counties of Carmarthen and Cardigan, on the other sides by St. George's and the Bristol channels. The length from St. David's Head to the borders of Carmarthenshire is 36 miles; from Strumble Head N. to St. Gowan's Head S. 31 miles. The area is 610 square miles. The population in 1841 was 88,044.

Surface and Rivers.—The surface of Pembrokeshire is generally undulating, with the exception of the Precelli Mountains, a range running from near St. David's Head to the borders of Carmarthenshire, which attain a height of 1754 feet above the sea.

There are a number of bays along the coast. Newport Bay is separated from Fishguard Bay by Dinas Head. Off St. David's Head lie Ramsey Island and a cluster of small islets called the Bishop and his Clerks. The coast here turns S. and shortly after forms St. Bride's Bay, which is about eight miles wide and as many in depth: off the southern point of the bay there are several small islands. Milford Haven, which is an æstuary at the mouth of the Cleddau, is about 20 miles in length. The mouth is about two miles wide, and it varies from that width to half a mile throughout. It contains numerous bays and creeks, completely landlocked, free from shoals and rocks, with excellent anchorage in deep water, and forms one of the finest harbours in the world. The southern coast presents a wild and inhospitable appearance: the carboniferous limestone forms precipitous cliffs 150 feet high, without any good port till we reach Tenby, situated near the S.E. extremity of the county. The two branches of the Cleddau or Cleddy are the principal rivers. The East Cleddy rises in the Precelli Mountains; the West Cleddy rises near St. Catherine's, runs by Haverfordwest, whence it is navigable for small vessels, and, uniting with the East Cleddy about five miles below that town, falls into Milford Haven. The other rivers are the Nevern, which empties itself into Newport Bay; the Gwayn, which falls into Fishguard Bay, and the Solva, which falls into St. Bride's Bay. The Teify divides Pembrokeshire from Cardiganshire.

Climate, Geology, Agriculture, &c.—The climate of the southern part of Pembrokeshire is mild, but the atmosphere is frequently charged with saline exhalations from the Atlantic during S.W. winds, and is consequently damp. The northern part of the county is higher, and has a considerably lower temperature.

If a line be drawn through the centre of Pembrokeshire E. to W. we find the stratified rocks north of that line composed of slates, grit, and shales; to the S. the older rocks are surmounted by the Silurian rocks, old red-sandstone, carboniferous limestone, and coal-measures. The whole surface is greatly diversified by trap-rocks bursting forth in many places, and altering the structure of the sedimentary deposits. The anthracite or stone-coal tract bisects the county; it is a continuation of the great coal-basin of South Wales, which extends over the whole coast of Carmarthen Bay.

Copper-ore has been found in small quantities in the neighbourhood of St. David's, but not sufficient to repay the cost of working. Slate-quarries are opened in the Precelli Mountains and near St. David's; the quality of the slates is inferior to those of North Wales. Coal is the only mineral besides slate which is worked in Pembrokeshire: it is of that description called anthracite, or stone-coal. The best coal is raised at Landshipping, on the shore of Milford Haven. A considerable quantity of good coal is also raised at Kinsmoor and Kilgetty, whence it is conveyed by a railway to the sea at Saundersfoot, where a dock has been built.

The geological formations of this county presenting great variety, the soil in different quarters is equally various. In the southern part of the county, the limestone and old-red sandstone formation afford soils of excellent quality. Some districts near St. David's, and along the coast towards Fishguard, are considered to be extremely well adapted for the growth of barley; but in the coal district and the slaty ridge of the Precelli Mountains, the land is very inferior. The state of agriculture is as various as the soil. Considerable advances have been made of late years, but a general want of capital among the farmers prevents any rapid progress. The breed of black cattle, known by the name of the Castle Martin breed, are bought in droves, for the supply of the London market principally. The breed of horses is much esteemed; they are rather small-sized. Labourers live in cottages, which are generally built with mud walls.

Divisions and Towns. — Pembrokeshire is divided into 7 hundreds. It is in the diocese of St. David's. It is in the South Wales and Chester Circuit, and the assizes are held at Haverfordwest. Pembrokeshire returns three members to parliament: one for the county, one for Pembroke, and one for Haverfordwest and its contributory boroughs.

The following are the chief towns, with the population of each in 1841:—

Fishguard, a seaport town at the mouth of the river Gwayn, 14 miles N. by W. from Haverfordwest, to which it is a contributory borough, is remarkable for little besides a fine fishing ground near the bay, frequented by small craft from Liverpool. The port is capable of accommodating 100 sail of merchantmen. The principal exports are corn and butter; the imports, coal, culm, limestone, &c. Population of the parish, 2013.

Haverfordwest, the capital of the county, a parliamentary borough, and municipal borough, is situated on the West Cleddy, 14 miles S. by E. from Fishguard. Haverfordwest is principally occupied by shopkeepers, mechanics, and persons of moderate independent fortune, for whom the cheapness of the place is an attraction. The streets are narrow, ill-paved, steep, and slovenly, but the town contains many excellent residences. The river is navigable at spring tides to Haverfordwest, for vessels of 100 tons burthen, at neaps, for little above 30 tons. The municipal borough is governed by 4 aldermen and 12 councillors: population, 5941. Haverfordwest in conjunction with the contributory boroughs of Narberth, Fishguard, and St. David's, returns one member to parliament.

Milford, 13 miles N. W. from Pembroke, over the ferry by the usual road, was a highly prosperous town till the removal of the dockyard and packet establishment. It is still a contributory borough to Pembroke. Population of the borough, 737.

Narberth, a market town, and contributory borough to Haverfordwest, is 11 miles E. from that town. It is ill-built, but is an active, thriving, and increasing place, being the central point of a large district, which is supplied by it with shop goods. Population of the parish, 2620.

Pembroke, a market town, parliamentary borough, and municipal borough, lies in a rich country on a navigable creek of Milford Haven, 10 miles S. by E. from Haverfordwest. The town consists of one long street, gradually ascending to the castle, which is situated on an abrupt rocky promontory at the west end. Pembroke, with Tenby, Wiston, and Milford, returns a member to parliament. About two miles from Pembroke, on the shore of Milford Haven, is situated the naval dockyard and arsenal, which was removed hither from Milford in 1814. This is the most important establishment in the county. The municipal borough is divided into 2 wards, and governed by 6 aldermen, and 18 councillors: population, 7412.

St. David's, one mile from the sea, and 16 miles N.W. from Haverfordwest, to which it is a contributory borough, was once the seat of the bishops, but is now an inconsiderable village. The roads are very bad on all sides. It is inhabited almost exclusively by the clergy who perform the duties of the cathedral, some farmers, and cottagers, a few of which last live by working the peculiar kind of woollen stuff worn by the natives of South Wales. Population of the parish, which includes the island of Ramsey and several hamlets, 2413.

Tenby, is a small seaport situated on the western side of Caermarthen Bay, 10 miles E. from Pembroke, and one of its contributory boroughs. There is little trade at Tenby: it is chiefly supported by its attraction as a watering-place. Population of the town, 2912.

Wiston is a small town contributory to the Pembroke district of boroughs: it is 4½ miles N.E. by E. from Haverfordwest. Population of the parish, 775.

History and Antiquities.—Pembrokeshire anciently formed part of the territory of the Demetæ. Giraldus Cambrensis informs us that it was conquered in the reign of Henry I. by Arnulf de Montgomery (brother to the Earl of Shrewsbury), who built the first castle of Pembroke of stakes and turf. In the same reign a colony of Flemings settled in that part of the county west of the Cleddy, who still retain their nationality completely distinct, and the district is hence termed 'Little England beyond Wales.'

Pembrokeshire is rich in antiquities. St. David translated the archbishopric from Caerleon to Menevia (St. David's) in the 6th century, whence the town took his name. The cathedral, which was built in the 13th century, is in the form of a cross, having a square tower, with pinnacles rising from the centre, at the intersection of the north and south transepts. The architecture is Norman mixed with the early pointed order.

Pembroke Castle stands on the extremity of an elevated rocky promontory. Giraldus Cambrensis informs us that it was built in the time of Henry I. It is of Norman architecture mixed with early Gothic. The principal tower remains perfect. During the civil wars of Charles I., this castle made a gallant defence for the crown, under Colonels Langhorne and Powell; it was taken and dismantled by Cromwell in 1648. Manorbeer Castle, near Tenby, is an extensive ruin. Near St. Gowan's Head is a cell cut in the face of the steep cliff, inaccessible except by a flight of steps. Here St. Gowan lived, and is said to have performed miraculous cures. Cilgenan Castle, on the Teify, was built by Marshall, Earl of Strigal (Chepstow), after he had conquered Gryffydd, Prince of Wales, in 1223. Picton Castle, at the confluence of the two Cleddys, was built in the reign of William Rufus. Near Pentre-Evan is a very large cromlech. There are several other Druidical remains in the neighbourhood. The church of Nevern is a very venerable pile, and one of the largest in the county. Besides the remains above enumerated are the castles of Carew, Narberth, Haverfordwest, Banton, Newport, Roch, Tenby, and others.

PEMPHIGUS is a disease of the skin, consisting of the eruption of one or more rather large blisters, containing serous fluid, and terminating either in thin scales, in superficial excoriations, or in ulceration. These blisters accompany very different conditions of the system, and require different kinds of treatment.

PEN. This simple but useful little instrument was formerly made of reed, but the quill has been used in this country for that purpose for about 500 years.

Of the common method of making pens by hand it is not necessary to speak; we shall therefore

only say a few words upon the manufacture of 'quill nibs.' The barrel of the quill in the first place has both ends cut off, and is divided down the centre; the halves are then laid on their convex side and the edges shaved smooth; after this they are divided into three or four lengths each, and the end of each length is made into a pen by a small machine, which at one time makes the slit and cuts the shoulders; they are then finished by being nibbed by hand. Pens are shaped differently according to the kind of writing for which they are intended.

Owing to the constant necessity for mending quill pens, the loss of time consequent thereon, and the inequality of the writing, an immense amount of labour and ingenuity has been employed to produce some more durable substitute. The only substitute however which has attained to anything like general use is the steel pen. These pens are manufactured to an amount in quantity and at a cost so small as hardly to be credible. Different makers have different modes of operation, but the following will give a general idea of the method employed. In the first place flat pieces of steel are cut out, of the shape required, by a stamping-press; they are then placed under another press, which pierces the holes and cuts the slits; and they are struck into their convex shape by a third press. They are then polished and tempered. The polishing is managed in rather a curious manner; a quantity of pens are shut up in an iron cylinder, leaving a considerable space unoccupied; this cylinder is attached at each end to a crank, the axes of which are connected by a wheel and set in motion by a handle or by machinery. Thus by being rubbed against each other the pens come out well polished, and with all the burrs or sharp angles left by the cutting-presses rubbed smooth. Gold, silver, platinum, rhodium, ruby, and other materials, have been occasionally employed, either for the whole pen, or for the nib.

Fountain-pens are so made as to hold a reservoir of ink. Music-pens are formed so as to make large dots as well as strokes. The geometric-pen is an ingenious mathematical instrument for drawing curves.

PENALTY, in its original and proper sense, is a pecuniary punishment imposed by statute upon parties guilty of certain offences. This term is also used to denote a sum of money which a party to a contract has engaged to pay in case he violates his engagement. Penalties imposed by statute are strictly regulated by statute; but with respect to penalties created by contract, the rule is neither so strict nor so uniform. In some cases the courts of common law can interfere, and alter the penalty; in other cases the interference of a court of equity is necessary.

PENANCE (in Latin, *Penitentia*) is a censure or punishment, imposed by the ecclesiastical law, for the purgation or correction of the soul of an offender, in consequence of some crime of spiritual cognizance committed by him. Thus a person convicted of adultery or incest was adjudged to do penance in the church or market, bare-legged and bare-headed, in a white sheet; and was required to make a public confession of his crime, and to express his contrition in a prescribed form of words. After a judgment of penance has been pronounced, the ecclesiastical courts may, upon application by the party, take off the penance, and exchange the spiritual censures for a sum of money to be paid and applied to pious uses. This exchange is called a commutation for penance; and the money agreed or enjoined to be paid upon such a commutation may be sued for in the ecclesiastical court.

PENANG, PULO, is the seat of government of the British possessions in the Strait of Malacca.

The Island of Penang, also called Prince of Wales' Island, lies between 5° 16′ and 5° 30′ N. lat., and between 100° and 100° 9′ E. long., and extends from south to north about 16 miles, with an average breadth of 8 miles, which gives a surface of nearly 130 square miles. This island consists of a mass of rocks, which occupy about two-thirds of the surface, and of two tracts of alluvial soil, which extend on the eastern and western sides of the rocks.

Wellesley Province lies opposite Pulo Penang on the Malay Peninsula, and is separated from the island by a strait. Wellesley Province extends from 5° 10′ to 5° 38′ N. lat., and lies between 100° 11′ and 100° 18′ E. long. It extends along the coast about 30 miles, and from 6 to 10 miles inland.

There are no permanent streams in the island of Penang, but several rivers traverse Wellesley Province from east to west, rising in the elevated mountains in the state of Keddah. These rivers, enumerated from north to south, are Muda, Pry, Juru, and Krean.

Penang derives its importance partly from the cultivation of spices, especially pepper, cloves, and nutmegs. Since palm-oil has been extensively used in the manufacture of candles in England, the plantations of cocoa-nut trees have greatly increased, and oil is made by the Chinese settlers in the country to a great extent. Sugar, indigo, tobacco, coffee, and cotton, are grown. Rice and Indian corn are the only kinds of grain cultivated. Fruit, vegetables, and timber trees, grow in great variety and abundance. Buffaloes and cattle are rather numerous. Poultry is plentiful. Wild animals of the largest size are found in Wellesley Province, as the elephant, rhinoceros, and tiger. The interior is abundantly supplied with birds, and the sea-coast with fish.

When the English took possession of Penang Island (1786), they found only a few Malay families, mostly fishermen; but natives from the neighbouring countries, as well as Chinese, and Chuliahs from Hindustan, soon flocked to it, and the population now consists of about 50,000. Wellesley Province contains about an equal number. The inhabitants consist chiefly of Malays; next to these in number are the Chinese. The Europeans are gradually increasing.

George Town is built on the eastern side of the Island of Penang, where it projects into the strait, and contains a population of 20,000, mostly Chinese. It is the seat of the governor of the British possessions on the Strait of Malacca, and

carries on a considerable commerce. *James Town* is a small but thriving place, about a mile from the sea on the eastern plain of Penang Island, in a very fertile district. There are no towns in Wellesley Province, but numerous villages.

Before 1786 the island and province belonged to the small kingdom of Keddah. At that time the British wanted a good harbour in those parts. The island was found fit for that purpose, and it happened to be the property of an Englishman, Capt. Francis Light, of a country ship, who had received it from the king of Keddah as a marriage portion with his daughter. Capt. Light transferred his property to the East India Company, and was appointed first governor of the island. The Company afterwards obtained the coast district of Wellesley Province, by agreeing to pay 6000 Spanish dollars annually to the King of Keddah for the sovereignty of the island, and increasing the payment to 10,000 dollars on the cession of Wellesley Province.

PENA'TES were Roman deities who were supposed to preside over families and houses. Cicero ('De Nat. Deor.,' ii. 27) derives the word either from *penus*, 'food,' or *penitus*, 'innermost;' but it appears probable that the latter etymology is the more correct. The hearth of the atrium was sacred to the Penates. There appears to have been sometimes a recess in the wall, called *sacrarium*, in which the images of the Penates were kept. The modern Genoese retain the custom of keeping household gods like the ancient Romans.

PENCIL, the name given to the small brushes used by artists, whether made of hog's bristles, camel's hair, fitch, or sable. The larger brushes are sometimes set in a tin tube, and the smaller are generally set in quills of different sizes.

The well-known black-lead pencil is made by cutting black-lead, or plumbago, into thin plates with a saw, and again into strips as wide as the plate is thick. These strips are then laid in a groove in a piece of cedar, upon which is glued another and thinner piece: the whole is afterwards rounded by a plane adapted to that purpose. The finest plumbago is obtained from a mine in Cumberland. Some pencils are filled with coloured chalk instead of black-lead.

The ever-pointed pencil is an instrument for using cylindrical pieces of black-lead, which are forced forward in the pencil just so far as to allow them to be used without breaking. The leads are manufactured of different thicknesses, and the pencil-cases are marked with a letter to correspond with the lead required for it.

PENCIL, a term of Optics, and sometimes of Geometry. A pencil of rays is a collection of rays which converge to or diverge from the same point; and a pencil of lines is a number of lines which meet in one point.

PENDANT. [BANNER.]

PENDENT, or PENDANT, in Gothic Architecture, an ornamental mass of stone, hanging down or descending from the intersections of a groined vaulting. Pendents, no doubt, originated in bosses, of which they may be considered an enlargement, and may be described as being of a corbel or bracket shape.

PENDULUM. [HOROLOGY.]

PENEUS. [THESSALY.]

PENGUINS, *Manchots* of the French. Family *Sphenisidæ* of some authors.

The Prince of Canino ('Specchio Generale,') regards the Penguins as forming a distinct family (of the Natatorial Order). They are birds utterly incapable of flight, having their paddle-wings clothed with short rigid scale-like feathers disposed in regular order. The tarsi are placed so completely behind, that in resting the birds assume naturally an upright attitude. The toes are webbed; the tarsi very stout and short. These birds are essentially aquatic, seldom visiting the shore, except during the breeding season, and their progress on land is very singular (some species using the flippers as fore-legs in progression). While swimming they are immersed above the breast. All are natives of the colder or moderate seas of the southern hemisphere. The bones, unlike those of birds in general, are hard, compact, and heavy, and have no apertures for the admission of air; those of the extremities containing an oily marrow.

The Penguins appear to be all gregarious in their habits, and to form large assemblages, or *towns*, the economy of which is said to be conducted with order and regularity.

The following genera are generally acknowledged.

Genus I., *Aptenodytes*. Examples:—The Emperor Penguin (*Aptenodytes Forsteri*), and the King Penguin (*Aptenodytes Pennantii*), species which appear to have been confounded together under the title of *Aptenodytes Patachonica*. Locality, the Straits of Magalhaens, and the adjacent islands, thence extending to Australia through the islands of the South Pacific.

Genus II., *Eudyptes* (*Catarrhactes*, Brisson). Example, *Eudyptes chrysocoma*, Vieillot; the Crested Penguin of English ornithologists. Locality, the Falkland Islands, the shores of Patagonia, the islands of Tristan d'Acunha and Amsterdam.

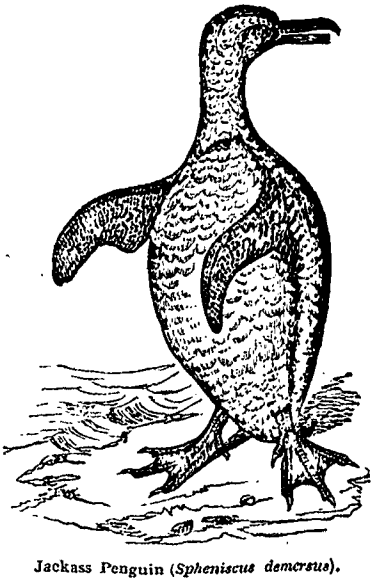
Genus III., *Spheniscus*. Examples: *Spheniscus demersus*. Locality, the Falkland Islands, Noir Island, the Cape of Good Hope. This is the Jackass Penguin of the English, so called from its peculiar cry. *Aptenodytes minor*. Locality, South-Eastern, Southern, and Western Australia; Van Diemen's Land, &c. *Aptenodytes undina*. Locality, Van Diemen's Land.

The following account of a colony of King Penguins is given by Mr. G. Bennett in the 'Zoological Proceedings,' 1834. They were seen at the north end of Macquarrie Island, in the South Pacific Ocean, and covered an extent of 30 or 40 acres. He describes the number of Penguins collected together in this spot as immense, but observes that it would be almost impossible to guess at it with any near approach to truth, as during the whole of the day and night, 30,000 or 40,000 are continually landing, and an equal number going to sea. 'They are arranged, when on shore, in as compact a manner and in as regular ranks as a regiment of soldiers; and are classed with the greatest order, the young birds

being in one situation, the moulting birds in another, the sitting hens in a third, the clean birds in a fourth, &c.; and so strictly do birds in similar condition congregate, that should a bird that is moulting intrude itself among those which are clean, it is immediately ejected from them. The females hatch the eggs by keeping them close between their thighs; and, if approached during the time of incubation, move away, carrying their eggs with them. At this time the male bird goes to sea, and collects food for the female, which becomes very fat. After the young is hatched, both parents go to sea, and bring home food for it; it soon becomes so fat as scarcely to be able to walk, the old birds getting very thin. They sit quite upright in their roosting places, and walk in the erect position until they arrive at the beach, when they throw themselves on their breasts, in order to encounter the very heavy sea met with at their landing-place.'

Mr. Bennett mentioned several instances of the appearance of Penguins at a considerable distance from any known land. They generally however indicate its neighbourhood.

The following interesting account is given by Capt. Fitz-Roy of the mode in which Penguins feed their young. The species on which he made his observations at Noir Island was probably the Jackass Penguin.



Jackass Penguin (*Spheniscus demersus*).

'Multitudes of Penguins were swarming together in some parts of the island, among the bushes and 'tussac' (thick rushy grass) near the shore, having gone there for the purpose of moulting and rearing their young. They were very valiant in self-defence, and ran open-mouthed, by dozens, at any one who invaded their territory, little knowing how soon a stick would scatter them on the ground. The young were good eating, but the others proved to be black and tough when cooked. The manner in which they feed their young is curious and rather amusing. The old bird gets on a little eminence, and makes a great noise (between quacking and braying), holding its head up in the air, as if it were haranguing the penguinnery, while the young one stands close to it, but a little lower. The old bird, having continued its clatter for about a minute, puts its head down and opens its mouth widely, into which the young one thrusts its head, and then appears to suck from the throat of its mother for a minute or two, after which the clatter is repeated, and the young one is again fed; this continues for about ten minutes. I observed some which were moulting make the same noise, and then apparently swallow what they thus supplied themselves with; so in this way, I suppose, they are furnished with subsistence during the time they cannot seek it in the water.'

PENITENTIARY. [PRISONS.]

PENKRIDGE. [STAFFORDSHIRE.]

PENN, SIR WILLIAM, born in 1621, entered into the sea-service, was made a captain in 1642, and an admiral in 1653 for his services against the Dutch. He was one of those who commanded when Jamaica was taken from the Spaniards in 1655, in which year he returned to England, and was elected member of parliament for Weymouth, but was committed to the Tower on the charge of having left his command without leave. After the Restoration he was created a knight, and was made a commissioner of the navy, governor of Kinsale, and a vice-admiral. He again went to sea in 1664, and was commander-in-chief under the Duke of York, in the naval victory over the Dutch in 1665. In 1666 he retired from service at sea, but continued to perform his other duties till 1669. He died in 1670.

PENN, WILLIAM, the only son of Admiral Penn, was born in London, Oct. 14, 1644. His first bias towards the doctrines of the Society of Friends, or Quakers, appears to have been produced by the preaching of Thomas Loe; the effect of which was, that, while at Oxford, Penn, together with some of his fellow-students, began to withdraw from attendance on the public worship of the established church, and to hold private prayer-meetings. They were fined by the college for non-conformity, but this did not deter them; for, an order from the king having required that the ancient custom of wearing surplices should be revived, Penn and his associates attempted to tear them from the backs of those students who wore them. For this display of intemperate zeal they were expelled from the college.

After travelling on the continent he returned to London, and was admitted a student of Lincoln's Inn, where he continued till 1666, when his father sent him to Ireland, for the purpose of managing his estates in that country. Happening to attend a religious meeting at Cork, he was so deeply impressed, that from this time he constantly attended the Quakers' meetings. At one of these, held at Cork, in 1667, he and others were apprehended by order of the mayor, who would have set Penn at liberty on his giving bail

for his good behaviour, but he refused, and was sent to prison with the rest. He wrote however to the Earl of Orrery, then lord president of Munster, requiring the release of all, but the earl contented himself with ordering Penn alone to be set at liberty. Admiral Penn now summoned his son home, and remonstrated with him and threatened him, but in vain. The admiral at last restricted himself to the demand, that he should take off his hat in the presence of the king, the Duke of York, and himself. But Penn refused to pay even this limited degree of 'hat worship,' at which the admiral was so much incensed that he turned him out of doors.

In 1668 Penn began to preach, and also published his first work, 'Truth exalted.' In this year he also wrote 'The Sandy Foundation shaken,' in which he professed his belief in the doctrine of the Trinity, but objected to the language in which it was expounded by the Church of England; and for this he was committed to the Tower. During his imprisonment, which lasted nearly seven months, he wrote his 'No Cross, no Crown,' one of his most popular works. In 1669, after his liberation, a reconciliation took place between him and his father, and he again went to Ireland, where he remained about twelve months.

In 1670 the Conventicle Act was passed, and Penn was one of the first sufferers under it. He was committed to Newgate for preaching to what was called 'a riotous and seditious assembly,' which consisted of the Quakers, who had been excluded from their chapel, and who now met in the open street, as near to it as they could. The jury, in opposition to the direction of the Bench, and in defiance of its threats, pronounced a verdict of acquittal. Soon after this Admiral Penn died, perfectly reconciled to his son, to whom he left estates worth 1500*l.* a year. In February, 1670-1, Penn was again committed to Newgate on a charge of preaching publicly, and he remained in prison six months. In 1677, in company with George Fox and Robert Barclay, he made a sort of religious tour in Holland and Germany. After his return, he was admitted to plead before a committee of the house, that the solemn affirmation of the Quakers should be admitted in the place of an oath, and to this effect an enactment passed the Commons in 1678, but was lost, in consequence of a prorogation, before it had passed the Lords.

We now come to an important event in Penn's life, the establishment of the colony of Pennsylvania. A tract of country on the west side of the Delaware was granted on petition by Charles II. to Penn and his heirs, in consideration of a debt of 16,000*l.* due from the crown to Admiral Penn, for money advanced for the service of the navy. To this the Duke of York added by cession a contiguous portion of territory lower down on the Delaware. The king's patent was dated March 4, 1680-1, and in this document he named the province, in honour of the founder and his father, Pennsylvania. Penn was constituted absolute proprietor and governor of the province. He published 'Some Account of Pennsylvania,' &c., and also 'Certain Conditions or Concessions,' &c., in which he offered easy terms of settlement to those who might be disposed to emigrate. Three ships soon set sail with settlers from England and Wales, chiefly Quakers. In 1682 he published 'The Frame of the Government of the Province of Pennsylvania in America,' and sailed for that country. Having founded the city of Philadelphia on the banks of the Delaware, and spent about two years in the province adjusting its political constitution, he returned to England about Midsummer, 1684. Within this short period no less than fifty sail arrived in the province with settlers from England, Ireland, Wales, Holland, and Germany.

In February, 1685, soon after Penn's return to England, Charles II. died, and the favour with which James II., when Duke of York, had regarded Admiral Penn, was transferred to his son. After the Revolution in 1688, his intimacy with James II. exposed him to suspicions, and he was four times arrested on accusations of being a concealed Papist and a Jesuit.

In 1699 he again sailed for Pennsylvania, with his wife and family, with the intention of making it the place of his future residence. He had been deprived of the government of Pennsylvania in 1692, and it had been annexed to that of New York; but it was restored to him in 1694 by an instrument of William and Mary. An attempt was afterwards made to take possession of the proprietary governments in North America, and to convert them into regal ones. A bill for this purpose was already before the Lords, when it was delayed by petition of the friends of Penn, who immediately embarked for England, where he arrived in December, 1701. The bill was dropped after his return, and the accession of Queen Anne once more restored him to favour at court. In the meantime Penn had become encumbered with debt. He had mortgaged Pennsylvania in 1708 for 6600*l.* In 1712 he agreed to sell his rights to the English government for 12,000*l.*, but was unable to complete the transaction by three apoplectic fits which followed each other in rapid succession, and considerably impaired both his memory and understanding. He survived however till July 30, 1718, when he died, at his seat at Ruscombe in Berkshire. Penn was twice married, and left children; to whom he bequeathed his property in Great Britain and America. The government and quit-rents of Pennsylvania devolved to the surviving sons of the second family, with the title of Proprietaries, and by them were sold to the state of Pennsylvania, after the American Revolution, for 130,000*l.* Penn's writings, which are numerous, were collected, and published, with a life prefixed to them, in 1728, 2 vols., folio.

PENNANT, THOMAS, was born of an ancient Welsh family, at Downing in Flintshire, June 14, 1726. He was educated at Wrexham School, and subsequently at Oxford, but took no degree in that university, though the honorary distinction of LL.D. was afterwards conferred on him. In 1761 he commenced the publication of his first great work, the 'British Zoology,' which was

printed in large folio, and when complete contained 132 plates. It afterwards went through many smaller editions, and received numerous additions. In 1765, during the progress of this work, Pennant made a tour on the Continent, where he was introduced to some of the celebrated foreign naturalists. Pennant in 1771 published a 'Synopsis of Quadrupeds,' illustrated with plates. He followed the arrangement which had been conceived by Ray, introducing however the genera established by Linnæus. The 'Synopsis,' when enlarged, was republished under the title of a 'History of Quadrupeds.' After his return to England, Pennant commenced a work on 'Indian Zoology,' of which 15 folio plates were published, the expense of which was partly defrayed by Sir Joseph Banks: it was soon discontinued. The next work which Pennant commenced was a systematic catalogue called the 'Genera of Birds;' this was intended to be similar in plan to the 'Synopsis of Quadrupeds,' but it was never completed. His last great work was his 'Arctic Zoology,' which appeared in 3 vols. 4to., in 1784-85-87, and contained 26 plates. When in his 67th year, he planned an extensive work, which was to embrace an account of every country in the world, with their productions, of which he published two volumes, in 4to., entitled a 'View of Hindostan.' Two more were brought out by his son, after his decease, and were entitled 'Outlines of the Globe,' which also include the description of India and the adjoining countries. Pennant wrote, among several other works, a 'Journey from Chester to London,' a 'History of London,' and a 'Tour in Wales.' He died in 1798, at his seat of Downing, where he had spent the greater part of his life.

PENNATULA'RIA, a family of *Zoophyta*. The Linnæan genus *Pennatula* included several species of compound *Zoophyta*, having an internal elongated axis. Lamarck divided them into seven genera, and constituted for them a grand section of the *Polypiaria*, under the title of *Polypi Natantes*, or Floating Corallines. One of these genera is *Encryuus*, which belongs to a very different group of animals. ('Animaux sans Vertèbres,' tom. ii.) Cuvier, avoiding this great error, employs eight generic distinctions. ('Règne Animal,' tom. iii.)

Blainville ('Actinologie,' p. 512) places the family of Pennatularia in his class *Zoophytaria*, and employs six genera, of which five were instituted by Lamarck and one by Cuvier.

PENNI, GIOVANNI FRANCESCO, was born at Florence, in 1488, and received the name of Il Fattore, or the Steward, from his having been entrusted with the management of the domestic affairs of Raphael. He however soon became one of his principal assistants. Of Penni's own works no frescoes and very few oil paintings remain. After the death of Raphael, Penni went to Naples, where he died in 1528.

PENNINE ALPS. [ALPS.]

PENNON. [BANNER.]

PENNSYLVA'NIA, one of the United States of North America, extends from 39° 43′ to 42° N. lat., and from 74° 40′ to 80° 30′ W. long. It is bounded E. by New Jersey and New York, W. by Ohio, N. by New York and Lake Erie, and S. by Virginia and Maryland. The length E. to W. is 307 miles; the width N. to S. is 160 miles. The area is 46,000 square miles. The population in 1841 was 1,724,033, of whom 64 were slaves.

Surface.—The Appalachian Mountains extend through the centre of the state in a general direction from S.S.E. to N.N.W. They consist of several ridges. The central mass is called the Alleghany Mountains, a term often applied to the whole of the Appalachian mountain-system. In the southern part of Pennsylvania it forms the watershed between the streams which descend eastward to the Potomac and Susquehana, and those which flow westward to the Ohio. The summit is broad, of nearly equal elevation, and from 2000 to 2500 feet above the sea. East of the Alleghanies are five or six ridges of much less elevation. The most eastern of these ridges is called the Blue Mountains, which extend N.E. to the Delaware. West of the Alleghanies, and south of 41° N. lat., are two broad valleys and two mountain-ranges, the Laurel Hills and the Chestnut Ridge. The valleys are about 1000 feet above the sea-level, and the ranges about 2000 feet. The south-eastern portion of the state rises gradually westward from the banks of the Delaware and Chesapeak Bay till it reaches the Blue Mountains. The north-western part of the state is a part of the plain which extends westward from the base of the Appalachian Mountains to the Mississippi. The higher parts of the mountain-ridges are covered with pines and cedars of various kinds. The soil in the lower parts is generally good. The richest soil is in the south-eastern part of the state, on both sides of the Susquehana.

Rivers.—The most important river of Pennsylvania is the Delaware. [DELAWARE, River.] The Susquehana rises in two branches. The eastern branch has its source in Lake Otsego, in 74° 40′ W. long., near the western declivity of the Tuscarora Mountains, in the state of New York. The western branch originates in Pennsylvania, in 78° 40′ W. long., in a mountainous tract by which the Laurel Hills are connected with the Chestnut Range. The two branches unite above Sunbury, the eastern branch having run about 260 miles, and the western 160 miles. After the junction, the Susquehana flows about 200 miles, and then enters Chesapeake Bay. It is not navigable, owing to the rapidity of its current, and the numerous rocky ledges over which it flows. The Juniata, after a course of about 180 miles, enters the Susquehana on the west, 11 miles above Harrisburg. The Lehigh enters the Delaware at Easton, and the Schuylkill enters it 7 miles below Philadelphia. The Brandywine rises in Pennsylvania, and falls into the Delaware. The western part of the state is drained by the two principal branches of the Ohio, the Alleghany and the Monongahela. [MISSISSIPPI, River.]

Climate and Productions.—In the mountainous region, the winters are severe; the cold is greater in the western part of the state than the eastern. In the south-eastern part the winters are mild.

Pennsylvania abounds in minerals. From the western declivity of the Alleghany Mountains the bituminous coal-fields of Pennsylvania extend into Maryland and Virginia, and occupy many thousands of square miles. This coal is mostly wrought in the neighbourhood of Pittsburg, where it is used for manufacturing purposes. The anthracite coal-field, which lies to the east of the Blue Ridge, is also of great extent, and is wrought to some extent. Iron-ore is in abundance, and limestone occurs in all parts of the state. Of agricultural products, there were raised in the year 1840, 12,993,218 bushels of wheat, 20,485,747 bushels of oats, 14,077,363 bushels of Indian corn, 6,544,654 bushels of rye, and 9,477,343 bushels of potatoes.

Manufactures.—The most important manufactures of Pennsylvania are those of iron. In 1840 there were 213 furnaces, which produced 98,395 tons of cast-iron, and 169 forges, &c., which produced 87,244 tons of bar-iron. There were 235 woollen manufactories, 337 fulling-mills, and 106 cotton manufactories. The quantity of bituminous coal obtained was 11,620,654 bushels. Steam-engines are manufactured to a large amount, chiefly at Pittsburg; altogether 1969 persons, in 1840, produced machinery to the value of 1,993,752 dollars. There are numerous other manufactures. In 1840 there were 12 daily newspapers, 10 semi-weekly, and 162 weekly.

The imports in 1842 amounted to 3,770,727 dollars; the exports to 7,381,788 dollars.

Education.—There were, in 1840, 8 colleges in Pennsylvania, besides several medical and theological seminaries; 290 academies; and 4968 primary and common schools.

Canals and Railroads.—The most important canal in Pennsylvania extends from Philadelphia, including a railroad of 37 miles, over the Alleghany Mountains, to Pittsburg, 400 miles. There are several other large canals and numerous small ones. The railroads are still more numerous. From Columbia to Philadelphia, 81 miles; Philadelphia to Reading, 95 miles; Tamaqua to Williamsport, 106 miles; and many others.

Divisions and Towns.—Pennsylvania is divided into 55 counties. The following are the principal towns, with the population of each in 1840:—*Carlisle*, 15 miles W. by S. from Harrisburg, is neatly built with brick and stone houses, is the seat of Dickinson College, founded in 1783, and contains 9 churches. Population, 4351. *Chambersburg*, 45 miles S.W. from Harrisburg, is situated in the valley of the Conecocheaque Creek, a branch of the Potomac. It contains a court-house and 8 churches. Population, 3239. *Easton*, 106 miles E.N.E. from Harrisburg, 58 miles N. from Philadelphia, is situated on the west bank of the Delaware, at the junction of the Lehigh.—There is a fine bridge here over the Delaware, 570 feet long, a chain bridge over the Lehigh, and two bridges over the Bushkill Creek, which falls into the Delaware at the same point. It contains Lafayette College and 5 churches. Population, 4865. *Erie*, 270 miles N.W. from Harrisburg, is situated on Presque-Isle Bay in Lake Erie. The harbour is one of the best on the lake. The town contains a court-house, gaol, and 7 churches. Population, 3412. *Harrisburg*, the capital of the state, 40° 16′ N. lat., 76° 50′ W. long., 98 miles N.W. by W. from Philadelphia, is situated on the east bank of the Susquehanna. It contains a handsome state-house, a Masonic hall, a county prison, and 9 churches. A covered bridge extends to an island in the river, and thence to the opposite bank, 2876 feet. Another bridge has been built recently. Population, 5980. *Lancaster*, 62 miles W. from Philadelphia, is situated near Conestoga Creek, and about 10 miles E. from the Susquehanna. It contains Franklin College, founded in 1787, and 9 churches. The Philadelphia and Columbia Railroad passes through the town. Population, 8417. *Philadelphia* is the largest city in Pennsylvania. [PHILADELPHIA.] *Pittsburg*, 200 miles W.N.W. from Harrisburg, 297 W. by N. from Philadelphia, is situated at the confluence of the rivers Alleghany and Monongahela, where they form the Ohio, which is here a quarter of a mile wide. The town is built in a triangular plain between the two rivers, with hills at the back filled with bituminous coal. There are three bridges across the Alleghany, and two across the Monongahela. It contained, in 1840, 25 furnaces and 5 forges, which manufactured machinery of the value of 1,219,000 dollars. It contains many other manufactories, and has also a large commerce, and about 90 steam-boats belong to Pittsburg and its suburbs. Among the public buildings are—a new court-house, of Doric architecture; the Western University of Pennsylvania; three market-houses; and 35 churches. Population, 21,115. *Alleghany City*, on the N.W. bank of the Alleghany, containing 15 churches and 10,089 inhabitants, and *Birmingham*, on the S. side of the Monongahela, with 1554 inhabitants, may be regarded as suburbs of Pittsburg. *Reading*, 57 miles N.W. from Philadelphia, is situated on the east bank of the Schuylkill. It contains a handsome court-house, a gaol, and 12 churches. Anthracite coal, iron-ore, and limestone, are obtained in the neighbourhood. Population, 8410.

History and Constitution.—Pennsylvania was originally settled by the Swedes in 1627, was conquered by the Dutch in 1654, and was ceded to the British in 1664. It was granted to William Penn [PENN], and after his death was sold by the proprietors to the United States. The constitution was adopted Dec. 13, 1787. It was last amended in 1838. The legislature consists of 33 senators, who are elected for three years, and 100 representatives, who are elected for one year. The governor is elected for three years. It sends 2 senators and 24 representatives to Congress.

PENNY. [MONEY.]

PENNYROYAL. [MENTHA PULEGIUM.]

PENOBSCOT. [MAINE.]

PENRITH. [CUMBERLAND.]

PENRYN. [CORNWALL.]

PENSA is an extensive government of Russia in Asia. It is bounded on the N. by Nischnei-Novogorod, on the E. by Simbirsk, on the S. by Saratoff, and on the S.W. and W. by Tamboff. It lies between 53° and 54° N. lat., 42° 20′ and

45° 20′ E. long. The surface is slightly undulating, and the general character of the country is a plain. It is watered by numerous rivers, but most of them are small and not navigable. The most important rivers are the Soura and the Moksha. There are six small lakes.

The soil of Pensa is fertile, and the produce includes corn, hemp, flax, potatoes, and fruit. Forest-trees are very abundant. The minerals are iron, vitriol, sulphur, and mill-stones. The chief employments of the inhabitants are agriculture, grazing, and bee-raising. There are few large manufactories. The country-people manufacture coarse linen and woollen cloth, and various other articles for their own use. The trade is chiefly carried on by land, especially with Nischnei-Novogorod. Annual fairs are held at Pensa, Nischnei-Lomoff, and Saransk. The exports are corn, flour, brandy, soap, wax, honey, potash, wool, sail-cloth, carpets, blankets, wooden-ware, &c. The population is rather more than 1,000,000, of whom nearly all are Russians of the Greek church.

Pensa, the capital of the government, is built on an eminence at the conflux of the Pensa and the Soura, in 53° 7′ N. lat. and 44° 50′ E. long. It is a flourishing town, with manufactures of leather and soap, in which, and in corn, there is a brisk trade. Pensa is a bishop's see, and has a gymnasium, a seminary, two convents, to each of which two churches are attached, seven other churches, and a cathedral. The houses are all of wood, and the population about 11,000. The capitals of the other nine districts, though not very interesting, are pretty considerable: the chief are Nischnei-Lomoff (7000 inhabitants), and Saransk (9000).

PENSACO'LA. [FLORIDA.]

PENSION, a payment, generally made annually or at some other shorter and regular period.

Before the reign of Queen Anne, the kings of England alienated or encumbered their hereditary possessions at pleasure. By the 1 Anne, c. 7, the power of burthening the revenue of the crown by improvident grants, to the injury of the successors of the throne, was materially abridged. On the accession of George III., in consideration of the surrender of the larger branches of the hereditary revenue, a Civil List was settled on his Majesty, amounting originally to 800,000*l.*, and afterwards increased to 900,000*l.*, on which the pensions were charged. There were no limits, except the Civil List itself, within which the grant of pensions was confined; and at various times, when debts on this list had accumulated, parliament voted considerable sums (Sir Henry Parnell, in his work on 'Financial Reform,' says 'some millions') for their discharge. The act 22 Geo. III. c. 82, which regulated the pensions on the civil list, asserted the principle that distress or desert ought to be considered as regulating the future grants of such pensions, and that parliament had a full right to be informed in respect to this exercise of the prerogative, in order to ensure and enforce the responsibility of the ministers of the crown. Mr. Burke's speech on introducing his bill is in the third volume of his 'Works,' ed. 1815.

Up to this time the Civil List pensions of Ireland, the pensions charged on the hereditary revenues of Scotland, and the pensions charged on the 4½ per cent. duties, had not been regulated by parliament.

In Ireland the hereditary revenue of the crown was used as a means of political corruption, the English act of 1 Anne, already cited, not being applicable to Ireland. In 1793, among other beneficial measures introduced and recommended on the authority of the lord-lieutenant, was a bill to limit the amount of pensions and to increase the responsibility of the Treasury, which was passed into a law. By this act (33 Geo. III. c. 34, Irish statutes), the pensions on the Civil List in Ireland were limited to 80,000*l.*, allowing a sum of 1200*l.* only to be granted in each year, until such reduction was effected. At the time of the act 33 Geo. III. being passed, the Irish pensions amounted to 124,000*l.*, and the amount was not reduced to 80,000*l.* until 1814. By the 1 Geo. IV. c. 1, the Irish Pension List was further reduced to 50,000*l.*, and no grants exceeding 1200*l.* were to be made in any one year until the list was so reduced.

The statute of 1 Anne, having been passed prior to the Union, did not affect Scotland; but by the 50 Geo. III. c. 3, the principle of parliamentary interference was established in reference to the hereditary revenues of Scotland; the amount of the pensions was reduced to 25,000*l.*, and no more than 800*l.* was to be granted in any one year, until such reduction was effected. At this period the Civil List pensions of Scotland amounted to 39,379*l.* By the 1 Geo. IV. c. 1, the hereditary revenues of Scotland were placed to the account of the consolidated fund.

On the accession of King William IV., the Pension Lists of England, Ireland, and Scotland were consolidated by 1 Wm. IV. c. 25, which also made provision for their reduction, on the expiration of existing interests, from an amount of 145,750*l.* net, to a future maximum sum of 75,000*l.* The Pension List for England was at this period 74,200*l.* net; Scotland, 23,650.; Ireland, 47,900*l.*

In 1830 the ministry of the Duke of Wellington was overthrown, on the question of referring the Civil List (which comprises the Pension List) to a select committee, Sir Henry Parnell's motion to that effect being carried by 233 against 204.

In February, 1834, in order to define with greater precision the class of persons to whom the grant of pensions ought to be confined, Lord Althorp, Chancellor of the Exchequer (afterwards Earl Spencer), moved resolutions to the following effect, which were agreed to by the House of Commons:—'That it is the bounden duty of the responsible advisers of the crown to recommend to his Majesty for grants of pensions on the Civil List such persons only as have just claims on the royal beneficence, or who, by their personal services to the crown, by the performance of duties to the public, or by their useful discoveries in science and attainments in literature and the arts, have merited the gracious consideration of their sovereign and the gratitude of their country.'

On the accession of Queen Victoria, in 1837, a select committee of the House of Commons, appointed to inquire into the Civil List, recommended—'That in place of granting a sum of 75,000*l.* for Civil List pensions, her Majesty should be empowered to grant in every year new pensions on the Civil List to the amount of 1200*l.*, these pensions to be granted in strict conformity with the resolutions of the House of Commons, of February, 1834.' These views were adopted by the House, and embodied in the 1 Vict. c. 2, the words of the resolution being introduced into the Act. Since the accession of Queen Victoria, still greater force has been given to the spirit of the act, in consequence of the recommendations of a select committee of the House of Commons, appointed in December, 1837, to inquire how far the pensions charged on the Civil List, as settled on the accession of William IV. ought to be continued, 'having due regard to the just claims of the parties, and to economy in the public expenditure.' [CIVIL LIST.]

PENSIONARY, GRAND, was the name generally given to the first magistrate of the republic of Holland, who was a member of the Seven United Provinces of the Netherlands. The Pensionary was the president of the council of the states or legislature of Holland, and he was for the time the first minister of the republic. He was elected for five years, but was generally confirmed indefinitely, and often for life.

PENTACHORD, an ancient Greek musical instrument, which had, as the word implies, five strings. The term also signified a scale of five sounds.

PENTADESMIS BUTYRA'CEA is a tree found in Sierra Leone, from which a fatty substance is obtained, which has given rise to its names of the Butter-Tree and Tallow-Tree.

PENTATEUCH is the Greek name of the first five books of the Old Testament. The Hebrew copies of the Pentateuch form one volume; the division of it into five books is first mentioned by Josephus, and seems to have been made either by the Septuagint translators, or before their time, and after the return of the Jews from Babylon. The 1st, 2nd, 4th, and 5th books of the Pentateuch are treated of under GENESIS, EXODUS, NUMBERS, and DEUTERONOMY. The 3rd book is called *Leviticus*, from its treating chiefly of matters pertaining to the priests, the sons of Levi. The space over which it extends is the first month of the second year after the Exodus, B.C. 1490.

PENTATEUCH, SAMARITAN. The Pentateuch was the only part of the Old Testament which the Samaritans received, and as, from feelings of national animosity, they held no intercourse with the Jews, their copies of the Pentateuch were preserved independently of the Hebrew copies. The Samaritan Pentateuch is entitled to rank with the Hebrew as an independent source for settling the sacred text. In some places it gives readings manifestly superior to those of the Hebrew. In many passages in which it differs from the latter, it agrees with the Septuagint.

PENTECOST, one of the three great Jewish feasts, so called because the day on which it began was the 5th from the 2nd day of the Passover. It was also called the *Feast of Weeks*, from its falling at the end of a series of 7 weeks, reckoning from the Passover, and also the *Feast of the Harvest*. It was a feast of thanksgiving for the harvest, at the end of which it fell, and among the sacrifices appointed for it were some of the first fruits of the harvest. This festival lasted 8 days.

PENTELICUS. [ATTICA.]

PENTLAND FRITH. [ORKNEY ISLANDS.]

PENTZ, PENCZ, or PENS, GEORG, born at Nürnberg about 1500, was first the pupil of Albrecht Dürer, and afterwards studied the works of Raphael at Rome. He died in 1550, at Breslau. Pentz was one of the most correct in design of the early German painters, perhaps the most correct. His prints are numerous, but his pictures are scarce; there are some at Nürnberg, and a few in the galleries of Berlin, Munich, and Schleissheim.

PENUMBRA (incomplete shade), that portion of space which, in the eclipse of a heavenly body, is partly, but not entirely, deprived of its light. In a solar eclipse, as long as any part of the sun is visible, the parties observing are in the penumbra, and not in the *umbra*, or complete shadow.

PENZANCE. [CORNWALL.]

PEONY. [PÆONIA.]

PEPIN, king of France, called 'le Bref,' or 'the Short,' son of Charles Martel, was Maire du Palais after his father's death, under the nominal king Childeric III., for the kingdom of Neustria and Burgundy; and when his brother Carloman gave up the government of Austrasia, and retired to a monastery, he obtained the entire authority. Childeric was dethroned in 750, and Pepin was constituted king.

Pepin waged successful wars against the Saxons, the Bavarians, and other German nations; he defeated the duke of Aquitania, and reunited his duchy to the domains of the crown; he favoured the clergy, and fixed the annual general assemblies of the Frankish nation for the month of May. He died at St. Denis, Sept. 768, at 54 years of age, in the 17th year of his reign. His son Charlemagne succeeded him as king of the Franks.

PEPO, a Latin term used by botanists to express that kind of fruit of which the gourd is the type.

PEPPER. [PIPER.]

PEPPERMINT. [MENTHA PIPERITA.]

PEPUSCH, JOHN CHRISTOPHER, an eminent musical theorist and composer, was born in 1667, at Berlin, in which city his father was minister of a Protestant congregation. At the age of 14 his talents attracted the notice of the Prussian court, in which he held some appointment till he attained his 30th year, when, being eye-witness of a murderous act of tyranny perpetrated by Frederick I., he resolved to quit his country. He first visited Holland, and then proceeded to London, and about 1700 was engaged to take the harpsichord at Drury Lane theatre. Though he composed much, and was generally successful, only one of his works is

known to the present age—the cantata, 'See from the silent Grove Alexis flies,' which has always been admired by every person of true taste. In 1710 he was one of the founders of the Academy of Ancient Music. In 1712 he, together with Handel, was engaged by the Duke of Chandos to compose for the chapel at Cannons. The next year he was admitted by the university of Oxford to the degree of doctor in music. He married the celebrated singer Signora Margarita de l'Epine, who brought him 10,000*l.* This did not induce him to relax in his pursuits. He selected and adapted, with admirable skill, the music for 'The Beggar's Opera,' for which he composed the overture. In 1731 appeared his 'Treatise on Harmony.' In 1737 he was chosen organist of the Charterhouse, London. In 1746 was read before the Royal Society his account of the 'Ancient Genera,' which appears in volume 44, No. 481, of the 'Philosophical Transactions;' previous to which however he had been elected a fellow of that body. Dr. Pepusch died in 1752, and was buried in the chapel of the Charterhouse.

PEPYS, SAMUEL, was born Feb. 23, 1632. His father was a tailor in London. Pepys was educated at St. Paul's School, London, and at Trinity College, Cambridge. Through the interest of the Earl of Sandwich he was nominated Clerk of the Acts of the Navy, and he entered on the duties of his office in 1660. In this employment he continued till 1673; and during those great events, the plague, the fire of London, and the Dutch war, the care of the navy in a great measure rested upon him alone. The Duke of York being lord-high-admiral, Pepys was by degrees drawn into a close personal connection with him, and had also the misfortune to experience some part of the calumnies with which he was loaded during the time of 'The Popish Plot.' The absence not only of evidence, but even of ground of suspicion, did not prevent Pepys being committed to the Tower (May, 1679). He was discharged, and rose to be Secretary of the Admiralty, which office he retained till the Revolution. On the accession of William III. Pepys retired into private life. He died May 26, 1703.

Pepys had an extensive knowledge of naval affairs. He understood and practised music; and he was a tolerable judge of painting, sculpture, and architecture. In 1684 he was elected President of the Royal Society. Pepys published 'Memoirs relating to the State of the Royal Navy of England for ten years, determined December, 1688,' 8vo., Lond., 1690. His 'Memoirs,' comprising his diary from 1659 to 1669, and a selection from his private correspondence were edited by Lord Braybrooke, in 2 vols. 4to., Lond., 1825, republished in 5 vols. 8vo., Lond., 1828. A new edition, containing many passages which had been suppressed in the former editions, has been recently published (1849).

PERA. [CONSTANTINOPLE.]

PERAMBULATION. A perambulation is a walking through or over ground for the purpose of settling boundaries, or preserving the evidence of them. There are perambulations of forests by justices or others; and of parishes by churchwardens and parishioners, with the minister, once a year. Manors and lordships also are or may be perambulated. Questions of boundaries are now generally determined by actions of trespass or ejectment. It was an old Roman practice, at the time of the Terminalia, in the month of February, to perambulate the boundaries of a district, or community, and also the boundaries of private properties.

PERAMBULATOR, an instrument in general use for measuring distances on roads. It consists principally of a wheel upon which it runs, and an index which shows the number of turns of such wheel reduced into miles, furlongs, poles, and yards.

The carriage or stock, which is divided in order to receive the wheel, is made of wood, and is about 8 feet long. At one end is a handle for the person who uses it, and the other is furnished with sockets in which the axle of the wheel turns. Upon the stock and just in front of the handle is the dial-plate, with its two hands by which the distance is registered. The wheel is 8 feet 3 inches, or ½ pole, in circumference; and upon one end of its axis is a small pinion, which works into a similar pinion at the end of a rod passing up the stock or carriage to the works beneath the dial-plate. Motion is communicated by means of this rod to a worm or micrometer-screw, which turns once round for each revolution of the carriage-wheel of the perambulator. This worm works into a wheel of 80 teeth, which is moved forward one tooth for every ½ pole, and carries a hand or index, which makes one revolution for 40 poles or one furlong. On the axis of this wheel is a pinion of 8 teeth, which works into a wheel of 40 teeth, and on the axis of this second wheel is a pinion of 10 teeth, which moves a wheel of 160 teeth. This last wheel carries another hand, which makes one revolution for 80 of the former, that is for 10 miles.

There are other instruments for the same or similar purposes, bearing different names, as *Waywiser* and *Odometer;* but the construction of all of them is very similar.

Waywiser is the name generally given to that form of the instrument which is applied to a carriage, in which, by a slight adaptation to one of the wheels of the carriage, the instrument is made to register the number of turns of such wheel, in the same manner as the Perambulator.

PERCH, or POLE. This measure, though now mostly used as a square measure (a perch usually meaning a square perch, or a square of a perch in length and breadth), was originally a measure of length, arising out of the custom of measuring small portions of land by a staff or pole. The word *pertica*, from which it comes, means a wooden staff. But the pole with which land was measured not only differed very much in different countries, but in different parts of the same country. By an early statute, entitled 'Compositio Ulnarum et Perticarum,' the perch was fixed at 16½ feet, or five yards and a *half;* and four perticatæ (though that word is not used) were defined as an acre. A perch is the quarter of a chain, and a square perch contains 30¼ square yards.

PERCHE, LE, a district in France, formerly a dependency of the province of Maine, and now forming portions of the departments of Sarthe, Orne, Eure-et-Loir, and Loir-et-Cher, was divided into *Haut-Perche*, of which Mortagne was the capital; *Perche-Gouet*, capital Montmirail; *Terres-Françaises*, chief town Tour-Grise-de-Verneuil; and *Thymerais*, of which Châteauneuf-en-Thymerais was the chief town.

PERCIDÆ, or *Percoïdes* of Cuvier, a family of acanthopterygious fishes, of which the Common Perch (*Perca fluviatilis*) may be considered as the type.

The first division of the *Percoïdes*, according to Cuvier, comprises all those species which have the ventral fins placed under the pectorals, five soft rays to the pectoral fins, seven branchiostegous rays, and two dorsal fins. It includes 16 genera.

The second division comprises those species in which the first or spinous dorsal is united with the second or soft-rayed dorsal, so as to form one continuous fin, and is composed chiefly of the great genus *Serranus*.

The third division embraces those Percoïd fishes which differ from the preceding in having less than seven branchiostegous rays. Like the *Serrani*, they have the first and second dorsal fins united, but there is often a deep emargination between the spinous and soft-rayed portion.

The fourth division is composed of such species as have more than five soft rays to the ventral fins, and more than seven branchiostegous rays. It contains three genera.

In the fifth division of Percoïd fishes the ventral fins are placed in advance of the pectorals. It contains five genera.

In the sixth division the ventral fins are placed behind the pectorals. It comprises three genera.

PERCIVAL, THOMAS, M.D., was born in 1740, at Warrington, in Lancashire. He studied at the university of Edinburgh, and took his doctor's degree at Leyden in 1765. In 1767 he settled in practice at Manchester, and quickly met with great success. Amidst his professional avocations, he found time for the pursuit of many experimental inquiries on subjects connected with medicine; and possessing considerable eloquence, he was fond of scientific discussion, and was mainly instrumental in the foundation of the Manchester Philosophical Society. He died at Manchester, Aug. 30, 1804.

Dr. Percival published many works. Most of his earlier writings appeared in the form of Memoirs in the 'Philosophical Transactions' of London and Manchester, and were afterwards collected and published in one vol., which came out in 1767, London, 8vo., with the title of 'Essays, Medical and Experimental.' To this two other volumes were afterwards added, in 1773 and 1778. All his works were collected and published together after his death by his son, in 4 vols. 8vo., London, 1807.

PERCOIDES. [PERCIDÆ.]

PERCUSSION, in Medicine, is the method of eliciting sounds by striking the surface of the body, for the purpose of determining the condition of the organs subjacent to the parts struck.

This means of diagnosis was first employed by Avenbrugger in the middle of the last century; it was afterwards extensively adopted by Corvisart in investigating the diseases of the heart, but its value, like that of all the other branches of auscultation, was not fully appreciated till Laennec made them the subject of his peculiar study. Since his time its value has been considerably enhanced by the labours of M. Piorry.

Everybody knows that when a hollow body is struck, there is a vibration produced in the air within it, which being communicated through the walls to the external air, produces a ringing sound, whose tone varies with the size of the hollow body, the material of which it is composed, and many other circumstances; but that if the same body be filled with a fluid or a nearly solid substance, no other sound is produced than that which results from the striking together of two solid bodies of the same materials as the wall of the cavity and the substance with which it is struck. On these circumstances the practice of percussion is based. If any part of the body beneath which there is a hollow organ, or one containing air in tubes, be struck, a resonance is produced; if any part which lies over a solid or a fluid be similarly struck, the sound emitted is merely the dull noise of two solid and rather soft bodies.

The modes of employing percussion are various. The simplest and most convenient is to place one finger of the left hand flat upon the part to be examined, and to strike it lightly but rather sharply with the ends of the three first fingers of the right hand set close together on the same level. Instruments called pleximeters have been invented by M. Piorry and others, but are now rarely used. Percussion is chiefly employed in the diagnosis of diseases of the lungs, heart, and abdominal organs.

PERCUSSION, CENTRE OF, the point of a system which moves about a fixed axis, at which a force may act in such a manner as to produce no pressure on the axis. Its distance from the axis is the same as that of the centre of oscillation.

PERCY, THOMAS, D.D., was born in 1728 at Bridgnorth, in Shropshire. He was educated at Christ-Church, Oxford, and early in life obtained the vicarage of Easton Mauduit, on which he resided, and the rectory of Wilby. In 1761, 1762, and 1763, he published translations from the Icelandic of five pieces of Runic poetry. In 1764 he published a new version of 'Solomon's Song,' with a commentary and notes; and in 1765, a 'Key to the New Testament,' which has been reprinted several times. In the same year appeared the work by which he is best known, 'Reliques of Ancient English Poetry.' In or about 1766 he was appointed domestic chaplain to the Duke of Northumberland. In 1769 he was made one of the chaplains of the king; in 1778 dean of Carlisle; and in 1782, bishop of Dromore. In 1770 he printed the 'Northumberland Household-Book,' and a poem, the subject of which is connected with the history of the Percy family, called 'The Hermit of Warkworth.' In the same year appeared his

translation, with notes, of 'The Northern Antiquities' of M. Mallet. He died at the palace of Dromore, Sept 30, 1811.

PERDICCAS, the son of Orontes, was one of the generals of Alexander the Great, to whom on his death-bed he delivered his royal signet, thus apparently intending to designate him as protector or regent of his empire. Alexander's wife Roxána was then far advanced in pregnancy, and in the mean time the Macedonian generals recognised as king, Arrhidæus, a natural son of Philip, a youth of weak intellects. Perdiccas took the command of the household troops which guarded King Arrhidæus, and he distributed among the chief generals the government of the various provinces, or kingdoms, subject to Alexander's sway. Roxána gave birth to a son, who was named Alexander; and as Statira, the other wife of Alexander, was pregnant, Perdiccas removed the jealousy and fears of Roxána by putting Statira to death. The generals of Alexander, who had become satraps of extensive provinces, refused to submit to Perdiccas and his puppet kings; and Antigonus, whom Perdiccas feared most, applied to Antipater, governor of Macedonia and Greece, and persuaded him to join in a common effort against Perdiccas, who was then in Asia Minor. Eumenes, who remained faithful to Perdiccas, was appointed by him to oppose Antipater and Antigonus, while Perdiccas marched against Ptolemæus, king of Egypt, who had joined the alliance against him. He crossed the Nile, but his campaign was a failure, and he was murdered in his tent B.C. 321, after holding his power for two years after the death of Alexander. [ANTIGONUS; EUMENES.]

PERDI'CIDÆ, the name of a family, or, according to some, of a subfamily of the *Tetraonidæ*. In the latter case the term should be *Perdicinæ*.

The birds of this group are widely spread, no quarter of the globe being without some of the family, all of which are more or less esteemed as food.

Genus I. *Perdix* (*Starna*, Bonaparte). Example, the Common Partridge (*Perdix cinerea*; *Starna cinerea*, Bonap.) It is the *Perdice*, *Pernisetta*, *Perniyona*, and *Starna* of the Italians; *Perdris des Champs* of the French; *Rebhuhn* of the Germans.

Localities.—Mr. Gould (and he is corroborated by other authors) considers this species as strictly European; though M. Temminck speaks of it as a visitor to Egypt and the Barbary coast.

The habits of this species are too well known to need a detailed account.

The above form has been separated from the other partridges, *Perdix Græca*, Briss., *Perdix rubra*, *Perdix petrosa*, &c., by the Prince of Musignano. The first of these is most probably the πέρδιξ (Perdix) of Aristotle. All these, which are European, as well as *Perdix Chukar* from the Himalaya Mountains, have a rudimentary blunt spur on the tarsus, which, with their general plumage and red legs and bill, seem to justify the Prince's separation.

The Greek Partridge inhabits the Alps, the Tyrol, Switzerland, Italy, Turkey, and the Archipelago. *Perdix petrosa* (the Barbary Partridge) is common on that part of the African coast and in the southern portions of Europe, especially those which are washed by the Mediterranean Sea. In the mountainous parts of Spain, and in the islands of Majorca and Minorca, Sardinia, Corsica, Malta, and Sicily, it is abundant; but it is rare in France, and not known in the north of Europe. *Perdix rubra*, the common Red-Legged, or Guernsey Partridge, is abundant in France and Italy, rare in Switzerland, and still rarer in Germany and Holland. Mr. Gould observes that it is confined to the European continent and the islands of Guernsey and Jersey, but M. Temminck states that it is found in Japan, where it was observed by Dr. Von Siebold and M. Bürger, identical in form and colour of plumage. It has been introduced into our preserves, and is now rather plentiful in some parts, especially in Suffolk. But we doubt whether those who have introduced it have much reason to be pleased with the importation.

Genus II. *Francolinus*. This is the genus *Pternistes* of Wagler, and *Chætopus* of Swainson.

The rudimentary spurs of the Red-Legged Partridges become in the Francolins well developed.

Geographical Distribution of the Genus.—The old continent and its islands. The form occurs in Europe, Asia, and Africa. The Francolins are forest birds, perch on trees, and feed on seeds, bulbs, &c.

Examples.—The European Francolin (*Francolinus Europæus*). Locality, the southern parts of Europe, Asia, and the North of Africa. The Ferruginous and Gray Francolin (*Francolinus Ponticerianus*). Locality, Hindustan. The Pileated Francolin (*Francolinus pileatus*). Locality, South and Central Africa.

Genus III. *Coturnix*. This genus is confined to the Old World and Australia. Example, the European Quail (*Coturnix dactylisonans*). This well-known migratory bird seems to be the Ortyx (ὄρτυξ) of Aristotle, who mentions the bird repeatedly in such terms as to its habits and migration as to leave little or no doubt on the point. It is the *Coturnix* of the Romans; *Quaglia* of the Italians; *Caille* of the French; *Wachtel* of the Germans; and *Quail* of the British. Locality, Europe, Asia, North Africa; no gallinaceous bird being more widely spread in the Old World.

The Quail is polygamous; and the nest of the female, if nest it may be called—for it is little more than a hole scratched in the ground, generally in some field of green wheat—contains, in this country, from six to twelve or fourteen bluish-green eggs. On the Continent, as many as eighteen or twenty have been found; but here six or eight is the usual number of a bevy, as the brood is called: covey is the term applied to a family of partridges.

Several allied species are exclusively Indian.

Genus IV. *Ortyx*. This genus is restricted to America. Example, the Virginian or Maryland Quail (*Ortyx Virginianus*). This species is generally spread over North America. It is the *Quail* of the inhabitants of New England, and the *Partridge* of the Pennsylvanians.

For a full and very interesting account of the history of this species, see Wilson's 'American Ornithology.' 'They rarely (he says) frequent the forest, and are most numerous in the vicinity of well-cultivated plantations where grain is in plenty. They, however occasionally seek shelter in the woods, perching on the branches or secreting among the brush-wood; but they are found most usually in open fields, or along fences sheltered by thickets of briars. Where they are not too much persecuted by the sportsmen, they become almost half domesticated; approach the barn, particularly in winter, and sometimes in that severe season mix with the poultry to glean up a subsistence. They remain with us the whole year, and often suffer extremely by long hard winters and deep snows. At such times the arts of man combine with the inclemency of the season for their destruction.

'The Quail begins to build early in May. The nest is made on the ground, usually at the bottom of a thick tuft of grass that shelters and conceals it. The materials are leaves and fine dry grass in considerable quantity. It is well covered above, and an opening left on one side for entrance. The female lays from fifteen to twenty-four eggs, of a pure white without any spots. The time of incubation has been stated to me by various persons at four weeks when the eggs were placed under the domestic hen. The young leave the nest as soon as they are freed from the shell, and are conducted about in search of food by the female.'

Genus V. *Lophortix*. This genus is separated from the preceding by the Prince of Musignano; it differs in possessing an elegant crest of plumes. Example, the Californian Quail (*Lophortix Californicus*). Locality, California, where, assembled in bands of two or three hundred, it frequents the low woods and plains.

Genus VI. *Hemipodius* (*Turnix*, Bonn.; *Tridactylus*, Lacép.; *Ortygis*, Illiger). This genus is spread through a part of Europe, Asia, Africa, Australia, and Oceaniæ. Col. Sykes describes several species in the 'Transactions of the Zoological Society,' as *H. pugnax*, *H. Taigoor*, and *H. Dussumieri*, natives of India.

Of African species we may notice *Hemipodius* (*Turnix*) *Lepurana* of Dr. Smith, who remarks that in the museum of the Army Medical Department at Fort Pitt, Chatham, there were the male and female of an Indian species of *Hemipodius* very closely resembling the *Hemipodius Lepurana*. They differ however, he observes, in so many minor points, that he feels disposed to regard them as belonging to a distinct species. In the catalogue of the Fort Pitt Collection, Dr. Smith has named this Asiatic species *Hemipodius Sykesii*, in honour of Col. Sykes, who, he justly states, has added so much to our knowledge of the zoology of India. ('Illustrations of the Zoology of South Africa.')

Mr. Gould ('Introduction to the Birds of Australia') proposes a family under the name of *Tinamidæ*, of which he makes *Turnicinæ* a subfamily, including the genera *Pedionomus*, and *Turnix* or *Hemipodius*. He describes and figures two species of the first, and eight of the latter in his 'Birds of Australia,' vol. v. He places the genera *Coturnix*, and *Synoïcus*, under the family *Tetraonidæ*. Of the first genus he describes a single species only; of the latter, which is closely allied to *Perdix*, four species.

PE'RGAMOS, or PERGAMUM, the most important town in Mysia, was situated north of the Caïcus, on a small stream called Selinus. It had a strong citadel situated on a conical hill. Pergamos had many large public buildings. The modern town, called Bergma, is still a place of some importance, and it contains many ancient remains.

Philetærus, whom Lysimachus entrusted with the care of his treasures at Pergamos, declared himself independent about B.C. 283, and remained master of the town until his death, B.C. 263. He was succeeded by his nephew, Eúmenes, who reigned 22 years, and was succeeded, B.C. 241, by his cousin, Attalus I., who assumed the title of king. The history of the kings of Pergamos is given in an Appendix to 'Clinton's Fasti Hellenici (vol. iii.). The last king was Attalus III., who died B.C. 133; and after his death the kingdom of Pergamos became a Roman province under the name of Asia, or was a part of that province, and Pergamos its capital. Pergamos was one of the churches to which St. John wrote ('Revelation,' i. 11; ii. 12).

PERGE. [PAMPHYLIA.]

PERGOLE'SI, GIOVANNI-BATTISTA, was born at Casoria, near Naples, probably in 1704. He was educated under Gaetano Greco and Durante, and at the age of 14, fully persuaded that melody and true taste were sacrificed to what was called learning, he was withdrawn, at his own request, from school, and immediately adopted the style of Vinci and Hasse. His first productions, among which was Metastasio's 'Olimpiade,' were coldly received, both at Naples and Rome, for his new manner was not understood. But the Prince di Stigliano procured an engagement for him at the Teatro Nuovo. There his light but elegant intermezzo, 'La Serva Padrona,' which afterwards made so extraordinary a sensation at Paris, was brought out in 1731. Though the dramatic compositions of Pergolesi met with little success during his short life, his productions for the church were duly appreciated, and received with the applause they deserved. He died of consumption in 1737.

PERIANDER. [CORINTH.]

PERICA'RDIUM. [HEART, vii. 45.]

PERICARDI'TIS. [HEART, DISEASES OF, vii. 51.]

PERICARP is strictly the shell of a seed-vessel, varying very much in texture, as between the grape, where it is fleshy; the bean, where it is hard and dry; and the peach, where it is succulent externally and stony in the inside; but in these cases always originally the simple sides o a free carpel.

PERICHÆTIUM is a name given by writers on mosses to the leaves that surround the bulbous base of the stalk or seta of the seed-vessel, or sporangium.

PE'RICLES was the son of Xanthippus, who defeated the Persians at Mỹcale, and of Agariste, niece of the famous Clisthenes. (Herod., vi. 131.) He was thus the representative of a noble family, and he improved the advantages of birth by those of education. He was a pupil of Zeno the Eleatic, and of Anaxágoras. In his youth, old men traced a likeness to Pisistratus, which, joined to the obvious advantages with which he would have entered public life, excited distrust, and seems to have retarded his appearance on the stage of politics. However, about the year 469 B.C., two years after the ostracism of Themistocles, and about the time when Aristides died, Pericles came forward in a public capacity, and before long became head of the popular party opposed to that of Cimon the son of Miltiades, who headed the nobles. About the time when Cimon was prosecuted and fined (B.C. 461), Pericles began his first attack on the aristocracy through the Areópagus; and he succeeded in depriving the Areopagus of its judicial power, except in certain inconsiderable cases. From this time until Cimon's recall, which Mr. Thirlwall places, though doubtfully, in the year 453, Pericles acted as a military commander and by his valour at Tanagra prevented that regret which Cimon's absence would otherwise undoubtedly have created. What caused him to bring about the recall of Cimon is doubtful. After the death of Cimon, Thucydides took his place, but in 444 Thucydides was ostracised, and Pericles was now the first man in Athens. He appears to have contributed to raise Athens from the situation of chief among allies, to that of mistress over tributary states. His finishing blow to the independence of the allies was the conquest of Samos and Byzantium.

From this time till the beginning of the Peloponnesian war, Pericles was engaged in peaceful pursuits. He covered the Acropolis with magnificent buildings, in which the beauty of architecture and of sculpture was combined. The drama was then at perfection in the hands of Sophocles; and by enabling the poor to attend theatrical representations, Pericles nurtured their taste and increased his own popularity by thus throwing open the theatre to all. Another innovation, of which Pericles is supposed to have been the author, was that of paying the dicasts or jurymen in the courts. At first the pay was only moderate, but it operated as a premium on attendance at the courts; the causes became a mode of excitement for a people whose intellectual activity made them particularly eager for anything of the kind, and thence resulted that litigious spirit which is so well ridiculed in the 'Wasps' of Aristophanes.

Pericles being descended by his mother's side from the family of Clisthenes, was implicated, according to the religious notions of those times, in the guilt of the murder of Cylon's partisans, which was committed at the very altars in the Acropolis. ('Thucyd.,' i. 126; 'Herod.,' v. 70, &c.) The Lacedæmonians, before the actual commencement of the Peloponnesian war, urged on the Athenians the necessity of banishing the members of the family who had committed this offence against religion, which was an indirect way of attacking Pericles and driving him into exile. The Athenians retorted by urging the Lacedæmonians to cleanse themselves from the guilt incurred by the death of Pausanias. [PAUSANIAS.]

Pericles lived to direct the Peloponnesian War for two years. His policy was to induce the Athenians to consider Attica merely as a post, to be held or resigned as occasion required. In the speech which he made before war was declared, as it is recorded by Thucydides, he impressed the Athenians with these opinions, representing the superiority of their navy, and the importance of avoiding conflicts in the field, which, if successful, could only bring temporary advantage—if the contrary, would be irretrievable.

At the end of the first campaign, Pericles delivered an oration upon those who had fallen in the war. This speech—the full transfusion of which into a modern language is an impossibility—exhibits a more complete view of the intellectual power and moral character of Pericles than all that the historian and biographer have said of him. The plague of Athens followed, and while it damped the activity of the Athenians, it increased their impatience of war. In spite of another harangue, in which he represented how absurd it would be to allow circumstances like a plague to interfere with well-laid plans, he was brought to trial and fined, but his influence returned when the fit was over. In the third year of the war, having lost his two legitimate sons, his sister, and many of his best friends, by the plague, he fell ill, and after a lingering sickness died.

The connection of Pericles with Aspasia is a part of his private life which is not quite clear. Aspasia was a foreigner, who came to Athens, and Pericles lived with her after divorcing his wife. He appears to have been much attached to her, and probably, as she was a woman of talent, and of great personal charms, she had some influence over him. Whether the jokes of Aristophanes as to the origin of the Peloponnesian

Bust of Pericles.

War, which he connects with the name of Aspasia, had any foundation, it is impossible to decide.

(Thucydides, lib. i., ii.; Plutarch, *Life of Pericles.*)

PERICRA'NIUM, is the tough fibrous membrane which covers the bones of the skull, and bears the same relation to them which the periosteum does to the bones of the rest of the skeleton. [BONE.]

PERIGEE, the point of the moon's orbit in which she is nearest to the earth.

PE'RIGORD, a former province of France, included in the military government of Guienne, now forms the department of DORDOGNE. Its capital was Périgueux.

PERIGUEUX. [DORDOGNE.]

PERIHE'LION, the point of the earth's orbit in which it is nearest to the sun. [APHELION.]

PERI'METER, the circuit or bounding lines of a plane figure; a term usually applied to rectilinear figures only, but without any particular reason for the restriction.

PERIODS OF REVOLUTION. By a period we mean a definite portion of time, beginning from a given epoch, which, being repeated again and again, will serve to divide all time subsequent to the epoch (or precedent, if the repetitions be also carried backwards from the epoch) into equal parts, for the purposes of common reckoning and historical chronology.

Periods may be divided into natural and artificial: the former immediately suggested by some recurrence of astronomical phenomena; the latter arbitrarily chosen.

When one period is contained an exact number of times in another, each recommencement of the larger one is also a recommencement of the smaller one: thus the day being exactly twenty-four hours, if any one day begin at the beginning of an hour, all days will do the same. But if the smaller period be not a measure of the larger, a longer period may be imagined, which may be called a *cycle*, consisting of the interval between the two nearest moments at which the smaller and larger periods begin together. Thus, a week of seven days and a month of thirty days give a cycle of seven months or thirty weeks, these two periods being equal.

The periods in which all others are expressed is the day, which is not, as many suppose, the simple time of the revolution of the earth, but the average time between noon and noon. To distinguish it from other days it is called the *mean solar* day.

The year, or the time between two vernal equinoxes, is not a uniform period, nor does the average of one long period give precisely the same as another. [YEAR.] For chronological purposes however it is useless to take account of this variation, and 365.2422414 days, the year of astronomers in our day, may be considered as more than sufficiently exact for any time. In fact the year is made to consist, in the long run, of 365.2425 days in the Gregorian calendar.

An Æra means either the commencement of an indefinite reckoning, or of a succession of periods. In the following list the figures following the years refer to months and days: thus A.D. 729.6.13 would stand for the 13th day of June, A.D. 729. We do not mean to say that the events in the following list did take place in the years, far less in the months, or on the days, which are set down; but only that those who used them as æras, took them as having happened in those years, months, and days. Thus the death of Alexander, according to Clinton, took place in B.C. 323, which is most likely to be right; but if those who afterwards made an æra of this death, reckoned from the 12th of November B.C. 324, that day is the æra, whether the event happened then or not.

Mundane æra of Constantinople	B.C. 5508.3.21
Civil æra of Constantinople	B.C. 5508.9.1
Mundane æra of Alexandria	B.C. 5502.8.29
Mundane æra of Antioch	B.C. 5492.9.1
Commencement of Julian period	B.C. 4713.1.1
Common mundane æra (Abp. Usher)	B.C. 4004
Mundane æra of the Jews	B.C. 3761
Civil Jewish æra	B.C. 3761.10.1
Caliyug (Hindu)	B.C. 3101
Æra of Abraham (Eusebius)	B.C. 2015.10.1
Olympiads	B.C. 776.7.1
Building of Rome (Varro)	B.C. 753.4.21
Building of Rome (Cato)	B.C. 752.4.21
Æra of Nabonassar (Babylonian)	B.C. 747.2.26
Metonic cycle	B.C. 432.7.15
Calippic period	B.C. 330
Julian reformation	B.C. 45
Death of Alexander	B.C. 324.11.12
Æra of the Seleucidæ	B.C. 312.9.1
Æra of Tyre	B.C. 125.10.19
Æra of Vicramaditya (Hindu)	B.C. 57
Cæsarean æra of Antioch	B.C. 49
Spanish æra	B.C. 38.1.1
Æra of Actium	B.C. 30.1.1
First leap-year of the Augustan reformation	A.D. 8
Æra of the Ascension	A.D. 38
Indiction of Constantinople	A.D. 312.9.1
Æra of the Armenians	A.D. 552.7.9
Hegira	A.D. 622.7.16
Æra of Yezdegird	A.D. 632.6.16
New Style	A.D. 1582
English adoption of New Style	A.D. 1752

Before the change of style in 1752, and from the 14th century to that time, the legal and ecclesiastical year began on the 25th of March, though it was very common in writings, &c., to begin it on the 1st of January. Hence January, February, and twenty-four days of March, were in one year, according to lawyers, &c.; and in another according to others. Thus the Revolution, so called, of 1688, took place in the February of that legal year, or, as we should now say, February, 1689. It is frequently written thus: February, $168\frac{8}{9}$, or February, 1688-9. Thus, King Charles was beheaded January 30, $164\frac{8}{9}$, or January 30, 1648-9.

We now come to the artificial periods which are of most use in chronological researches: these are—

1. The Cycle of the Sun, or more properly the Cycle of Sundays.

2. The Cycle of the Moon, or of nineteen years, or of the Golden number, or of the Primes, or the Metonic Cycle with its æra altered.

3. The Cycle of Indictions.

4. The Paschal Cycle.

5. The Julian Period.

1. *The Cycle of the Sun* is a period of 28 years, compounded of 7 and 4, the number of days in a week, and the number of years in the interval of two leap-years. This, *in the old style*, makes the Sundays return to the same days of the year.

2. *The Cycle of the Moon* is that of 19 years, which is very nearly 235 complete lunations, as follows:—the 235 mean lunations of 29.53059 days each make 6939.69 days, while 19 years of 365 days each give 6935 days, and, allowing 4¼ days for leap-years, 6939.75 days. Hence 235 lunations fall short of 19 Julian years by .06 of a day, or one day in about 317 years. Hence during a period of 300 years, and as far as the mean place of the moon is concerned, the new and full moons of the cycle of nineteen years would fall on the same days.

3. *The Indiction* was an edict of the Roman emperors, fixing the tribute, and as one such edict was supposed to have appeared every fifteen years, years were naturally reckoned according to their distance from the year of Indiction. There is doubt about the first origin of indictions, about their meaning and their earliest date: all we have here to do with is the fact, that from Athanasius downwards, they were more or less employed by ecclesiastical writers in describing epochs. The popes afterwards adopted this mode of dating, and the common Indiction found in chronological tables begins so that A.D. 313 is the first year of the first cycle of Indiction, each cycle containing 15 years. At this rate A.D. 1 was the fourth year of an imaginary preceding indiction, and the remainder of three more than the date of any year divided by 15 will give its position in its cycle of Indiction. Thus 1239, increased by 3 and divided by 15, gives the remainder 12, or A.D. 1239 is the twelfth year of a cycle of Indiction.

4. *The Paschal Cycle* is one compounded of 28 and 19 years, or 532 years, during which time the cycles of the sun and of 19 years run through all their combinations, and recommence them again. According to the old system then, this is the cycle of Easter Days, which begin again in the same order when it is finished. A.D. 1 was the second year of the first paschal cycle, being also 2 of the cycle of 19 years, and 10 of its solar cycle. The paschal cycle of the Gregorian Calendar would be 53,200 years.

5. *The Julian Period* was imagined by Julius Scaliger, and is a combination of the solar cycle, the cycle of 19 years, and that of Indictions. Now $28 \times 19 \times 15$ gives 7980 years, which is the length of the period in question. It was made to begin at a year B.C., which was the first year of each cycle, namely, B.C. 4713 years. Hence, subtract any year B.C. from 4714, or add any year A.D. to 4713, and you have the year of the Julian period answering to the date used. The advantage (if it be one) of this period is, that by dividing the year in it by 28, 19, and 15, the remainders show the years of the different cycles belonging to the Julian date used, remembering when the remainder is nothing to substitute the divisor instead.

PERI'ŒCI (περίοικοι), an old astronomical term for those who have the same latitude, but opposite longitudes.

PERIOSTEUM. [Bone.]

PERIPATETICS (περιπατητικοί) is the name given to an ancient philosophical sect; so designated, it is said, from the circumstance of its founder, Aristotle, being accustomed to deliver his doctrines while walking in the grove of the Lyceum in the suburbs of Athens. Aristotle had a series of successors, who taught his doctrines, with some modification. The Peripatetic philosophy was introduced into Rome probably by Carneades, and from that time, or at least from the time of Sulla the Dictator, it continued to be studied by a few men who had learned leisure.

PERI'PHERY, the Greek word for circumference; a term applied both to rectilinear and curvilinear figures.

PERIPNEUMONY (*Peripneumonia*). [Lungs, Diseases of the.]

PERIPTERAL. [Civil Architecture, iv. 611.]

PERI'SCII (whose shadows move round). In those latitudes which are high enough to have the sun for twenty-four hours together, the shadows make complete revolutions, whence the inhabitants may be called Periscii (Περίσκιοι).

PERISTO'MIANS, Lamarck's name for a family of fluviatile operculated *Trachelipods* (*Gastropods* of Cuvier and naturalists), breathing water, consisting of the genera *Valvata*, *Paludina*, and *Ampullaria*. (Cuvier's 'Règne Animal,' vol. iii., pp. 78, 79, 81, &c.) The genus *Valvata* has hitherto been found only in Europe and North America. The genus *Paludina* is widely spread, occurring in Europe, Asia, Africa, and America. Example, *Paludina vivipara* (*Helix vivipara*, Linn.), common in the rivers and ponds in England, France, Germany, &c. The genus *Ampullaria* is found in the rivers and lakes of warm climates only. Fossil Peristomians occur in various tertiary and older strata.

PERISTO'MIUM, in mosses, is the ring or fringe of bristles or teeth which are seated immediately below the operculum, and close up the orifice of the seed-vessel. This organ is highly hygrometrical, and is supposed to assist in dispersing the spores or seed-like particles by which such plants are propagated.

PERITONE'UM is the membrane by which the walls of the abdominal cavity are lined, and all the abdominal organs are covered. The name is also sometimes applied to the cavity itself. The arrangement of the peritoneum is similar to that of other serous membranes. It is the peritoneum which gives to all the organs within the abdomen their peculiar shining surfaces, and which, by its duplicatures, forms the mesentery, omentum, and other folds, by which those organs are attached to each other and to the wall of the abdomen, and through which their vessels pass.

PERITONI'TIS is an inflammation of the

peritoneum. It may exist either as an acute or as a chronic disease. The chief symptoms of the acute form are pain, swelling, and tenderness of the abdomen, accompanied with fever and a frequent, small, and hard pulse. The pain in peritonitis is usually much more severe than that of any other inflammatory disease of the intestines or other abdominal organs. It is acute and cutting, and sometimes occurs in paroxysms; it is generally diffused, but occasionally it is almost confined to a single part of the abdomen; but its most distinguishing character is that it is greatly increased by pressure, so that in a severe case the patient cannot support so much as the weight of the bed-clothes, but lies on his back with his knees drawn up, and breathes quickly and lightly, moving the diaphragm as little as possible, so as to avoid the pain which its pressure would excite in the inflamed parts. The bowels in cases of peritonitis are usually, but by no means constantly, constipated; commonly also there are present nausea, vomiting, and hiccup, and almost always excessive thirst and prostration of strength. If not checked in its course, acute peritonitis usually terminates fatally in from five to ten days; the patient becoming more and more depressed, and all the symptoms regularly increasing till within a short time of death, when the pain commonly ceases, and a deceptive improvement in many of the other signs of the disease takes place.

The usual morbid effects of peritonitis are the effusion of serum with lymph or pus into the cavity of the abdomen, and adhesions of the opposite surfaces of the several organs within it.

The causes of peritonitis are—exposure to cold, and injuries of the peritoneum, as by tumours developed within the abdomen, by the obstructions which occur in strangulated hernia, and intussusception, of which it is a constant consequence, by the spreading of disease from the adjacent viscera, by heavy blows and falls on the abdomen, by penetrating wounds inflicted in operations for hernia or in other circumstances, by the passage of foreign bodies into the cavity of the abdomen, and especially by the ulcerative perforation or accidental rupture of any of the organs contained within it, and the escape of their contents, circumstances which are productive of the most certainly and rapidly fatal form of the disease.

The appropriate treatment of peritonitis consists in the early employment of copious bleeding, and the administration of calomel and opium.

Acute peritonitis sometimes, after fifteen or twenty days' continuance, assumes a chronic form; or the inflammation may from its commencement be of slow progress. In either case the symptoms are usually very obscure; the pain being but slight, or discoverable only by considerable pressure, and the swelling or tension of the abdomen occurring only at a late period of the disease. In the treatment of chronic peritonitis, local bleedings should be frequently employed, and blisters, or other counter-irritants applied over the abdomen. The diet should be light and nutritious, and, as often as they seem necessary, mild purgatives may be administered. Frictions of ointments containing mercury or iodine are also useful, and iodine should be administered internally when the patient is of a scrofulous constitution.

PERIWINKLE, the vernacular name for the well-known species of *Turbo* which is hawked about the streets and sold in great quantities, especially to the poorer classes. In very hot weather and the decline of the year they are often unwholesome, especially if there be any predisposition to disordered functions of the abdominal viscera prevalent. Instances have been known where the introduction of a cargo of periwinkles into a village has been followed by a fearful amount of death consequent upon attacks similar to cholera, if not cholera itself. Taken in moderation and when in high condition, they do not seem to be an unhealthy food. The Linnæan name for the genus is *Turbo littoreus*. Pennant states the belief of the Swedish peasants that when these shell-fish creep high up the rocks, they indicate a storm from the south. Linnæus quotes Stroem, the Norwegian, for a different augury when they creep up the strand; he says that it denotes a land wind and a calm in-shore. The food of the periwinkle is generally considered to be vegetable only.

PERIZONIUS, JAMES VOORBROEK, born at Dam in the province of Groningen, in 1651, studied at Deventer and afterwards at Leyden under Grævius. In 1674 he was appointed rector of the gymnasium of Delft, and in 1681 he was made professor of eloquence and history at Franeker. In 1693 he removed to Leyden as professor of history and the Greek language. He died at Leyden in 1715. Perizonius was one of the most distinguished scholars that Holland has produced. Of his various works the 'Animadversiones Historicæ,' is still useful to classical students.

PERJURY (from the Latin *perjurium*), by the common law of England, is the offence of falsely swearing to facts in a judicial proceeding. To constitute this offence the party must have been lawfully sworn to speak the truth by some court, judge, or officer having competent authority to administer an oath; and, under the oath so administered, he must wilfully assert a falsehood in a judicial proceeding respecting some fact which is material to the subject of inquiry in that proceeding. In a legal sense, therefore, the term has a much narrower import than it has in its popular acceptation. A person may commit perjury by swearing that he *believes* a fact to be true which he *knows* to be false. It is immaterial whether the false statement has received credit or not, or whether any injury has been sustained by an individual in consequence of it. The offence of perjury is a Misdemeanour.

A defendant in equity is guilty of perjury by false swearing in his answer to a plaintiff's bill.

The punishments of perjury by the common law were—discretionary fine and imprisonment; the pillory, which punishment was abolished (by 1 Vict. c. 23) in 1837; and a perpetual incapacity to give evidence in courts of justice. The present penalties of perjury are fixed by statute: they are fine, imprisonment, and transportation for seven years.

By the 5 & 6 William IV. c. 62, declarations may now be substituted for oaths in many extra-judicial proceedings. [OATH.]

PERM, an extensive government of Russia, is situated partly in Europe and partly in Asia, between 56° 30′ and 61° 30′ N. lat., and 53° 20′ and 64° 10′ E. long. It is bounded on the N. by Wologda and Tobolsk, on the E. by Tobolsk, on the S. by Orenburg, and on the W. by Viatka. The area is about 125,000 square miles. The population is 1,637,700.

The government is mountainous, and is divided by the Ural Mountains, which traverse it from north to south, into two unequal parts, the smaller of which is in Asia. The mountainous parts are covered with forests, in some of which there are immense marshes. The southern parts of the government, on the European side, are fertile and well cultivated, but the other portions are more suitable to pasture than tillage. The principal rivers are the Kama, Tchoussovaia, Sosva, Toura, and Sceth. There are numerous lakes. The climate is cold, and the agricultural produce very limited. The forests contain an immense store of fine timber. Game and fur-bearing animals abound. Horses, swine, sheep, cattle, goats, and bees, are reared. The chief wealth of the province lies in its mines of gold, iron, copper, and precious stones.

Three-fourths of the inhabitants are Russians, the remainder are Permians. Nearly all the inhabitants profess Christianity.

There are some manufactures of cloth, leather, soap, candles, &c. Trade is very brisk, partly in consequence of the facility for water-carriage.

Perm, the capital of the government, is a modern town, having been built in obedience to a ukase of Catherine II., issued in 1780. It is situated in 58° N. lat. and 56° 30′ E. long., at the conflux of the Iagouschika and the Kama. The streets are broad and regular, the houses almost all of wood, and the town is surrounded by a boulevard planted with trees. The population is about 10,000. The other chief towns are—EKATERINENBURG; *Kungar* (6000 inh.); *Solimansk* (5000 inh.); *Nischnei-Newiansk* (12,000 inh.); and *Irbizk* (4000 inh.).

PERNAMBUCO, a seaport in Brazil, situated in 8° S. lat. and 34° 50′ W. long. It consists of two towns, Recife and Ollinda, nearly 3 miles distant from one another. The Citade do Recife consists of three different parts, called Bairro do Recife, Bairro de São Antonio, and Bairro de Boa Vista. The Bairro do Recife is built on the south-eastern extremity of a low and sandy peninsula formed by the mouths of two small rivers. The town is indifferently built, and the streets are narrow, but generally paved. The Rua das Cruzes, which is the only wide street, contains many substantial houses. A stone bridge leads from Recife to the Bairro de San Antonio; in which there is a small square, surrounded with neat houses, and forming a kind of bazaar, consisting solely of shops. The treasury and the governor's palace are situated in San Antonio. This part of the town is united to the Bairro de Boa Vista by a bridge chiefly of wood. It is built with great irregularity on an undulating plain, and has lately increased more than the other parts of Recife, many neat country-houses having been erected in the plain, which are surrounded by groves of cocoa-nut trees. Recife has a college, with three professors of Latin, one of philosophy, and another of eloquence and poetry.

Ollinda is beautifully situated upon a cluster of eminences which are connected with the mountains farther west. It was once a considerable town, but has been on the decline for the last two centuries. It is rather well built, contains many convents, an episcopal palace, a botanic garden, and a college.

The population of all the places which thus constitute the town and port of Pernambuco was, in 1845, 92,134, exclusive of slaves. The foreign commerce of the port is very large.

PERODICTUS. [LEMURIDÆ.]

PERONNE. [SOMME.]

PEROUSE, JEAN FRANÇOIS GALAUP DE LA was born in 1741, at Alby, in the department of Tarn, in France. He entered early into the French navy, and was appointed midshipman in 1756. He distinguished himself in several naval actions. After the re-establishment of peace (1783), the French government wishing to rival the English in making discoveries in the Pacific, La Perouse was appointed commander of a squadron consisting of two frigates, the Boussole and the Astrolabe. He sailed from Brest Aug. 1785. After doubling Cape Horn he sailed along the western coast of North America to Monterey, and thence to Canton, and along the eastern coast of Asia to Avatsha in Kamchatka. From Avatsha he sent one of his officers with an account of his voyage to Paris by land. From Avatsha he sailed to the Navigators' Islands, where the captain and eleven of the crew of the Astrolabe were killed by the natives. Having reached Botany Bay, where Governor Philip had just arrived to found a colony, he sent home a continuation of the account of his voyage. After leaving Botany Bay he was for a long time never heard of; but it was finally ascertained that his vessels had been wrecked on one of the islands of Santa Cruz, or Queen Charlotte Islands.

PERPENDICULAR (overhanging), the name given to a line or plane which meets another line or plane without inclining to one side or the other.

PERPETUATION OF TESTIMONY. A party who has an interest in property, but not such an interest as enables him immediately to prosecute his claim, or a party who is in possession of property and fears that his right may at some future time be disputed, is entitled to examine witnesses in order to preserve that testimony, which may be lost by the death of such witnesses before he can prosecute his claim, or before he is called on to defend his right. This is effected by such party filing a bill in equity against such persons as are interested in disputing his claim, in which bill he prays that the testimony of his witnesses may be perpetuated. This is the only relief that the bill prays. If the prayer of the bill is granted, a commission issues to examine the witnesses, whose depositions are taken in the

usual way in suits in equity. The depositions, when taken, are sealed up and retained in the custody of the court which grants the commission. When they are required to be used as evidence, they can be so used, with permission of the court, by the party who has filed his bill or those who claim under him, and they can be read by the direction of the court as evidence on a trial at law, if it is then proved that the witnesses are dead, or from any sufficient cause cannot attend. If the witnesses are living when the trial takes place, and can attend, they must be produced. A defendant to such a bill may join in the commission, and may examine witnesses under the commission, and he is entitled to use their depositions as evidence in his favour at a future trial. (1 Mer. 434.)

PERPETUITY. [SETTLEMENT.]

PERPIGNAN, capital of the French department of Pyrénées-Orientales, is situated at the junction of the Basse with the Tet, 5 miles W. from the Mediterranean, 525 miles S. from Paris, in 42° 41′ 55″ N. lat., 2° 53′ 55″ E. long., and has 20,792 inhabitants. Perpignan, formerly the capital of Roussillon, passed with the rest of that province into the hands of the kings of Aragon, and became in 1349 the seat of a university founded by king Pedro. In 1474 it was taken, after a most vigorous resistance, by Louis XI. of France. Having been restored to Spain, it was again taken in 1642 by Louis XIII., and was included in the cession of Roussillon to the French. The town is built partly on the slope of a hill, and partly in the plain at its foot, on the right bank of the Tet, over which there are two bridges. A strong citadel commands the town on the south side. The defences of the town, consisting of ramparts flanked with bastions and protected by terraces from the besieger's fire, of advanced redoubts, covered ways, &c., were all thoroughly repaired in 1823, and now make Perpignan one of the strongest places in France. There are barracks for 5000 men, built by Louis XIV., and occupying one side of the parade. Perpignan is divided into the old and new towns. The streets, with the exception of Notre-Dame and St.-Martin, are narrow and dark, and the houses ill built. The most remarkable buildings are—the cathedral of St.-Jean, the churches of St.-Jean-le-Vieux, and La-Real, the town-house, the mint, the former churches of the Cordeliers, Carmelites, and Dominicans, the Carmelite convent, now the arsenal, &c. The town gives title to a bishop. It has tribunals of first instance and of commerce, a custom-house, a college, a clerical school, two hospitals, a theatre, a botanic garden, and a public library of 13,000 volumes, kept in a part of the old university buildings. The manufactures are broad cloth and woollen stuffs, playing cards, leather, brandy, soap, and corks. The chief articles of commerce are red and liqueur-wines, brandy, oil, silk, wool, iron, and cork. Half way between Perpignan and the sea is the hamlet of *Castell-Roussillon*, which stands on the left bank of the Tet, and occupies part of the site of the ancient *Ruscino*.

PERRAULT, CLAUDE, born at Paris in 1613, was the son of an advocate, and was brought up to the medical profession. His attention became more especially directed to architecture on being engaged by Colbert to undertake a translation of Vitruvius, the first edition of which appeared in 1673, in a folio volume, with plates after his own drawings. He had in the meanwhile given indisputable proof of his practical ability and superior taste in the east front and colonnades of the Louvre. Perrault's other chief works are the Observatory, and the Grotto, &c., at Versailles. The monument which, after the Louvre, would have best maintained his fame, the grand triumphal arch at the entrance of the Faux-bourg St. Antoine, was never executed. Besides his translation of Vitruvius, he published an abridgment of it, 1674; a work 'On the Five Orders,' fol., 1683; 'Essais de Physique,' 2 vols. 4to., 1680; and a work on natural history; to which may be added a posthumous one (1700), giving an account of several machines of his invention. He died at Paris, Oct. 9, 1688.

PERRAULT, CHARLES, brother of Claude Perrault, born Jan. 12, 1628, possessed also some talent for architecture, which procured for him the appointment of 'premier commis des bâtimens du roi.' He is now chiefly known as the author of the 'Parallèle des Anciens et Modernes,' Paris, 1690. One of his most interesting literary productions is his own Mémoires, first published at Avignon, in 1759. He died in 1703.

PERRY, JAMES, was born in Aberdeenshire, Oct. 30, 1756. He studied Latin at the grammar school of Aberdeen, and was afterwards a student of Marischal College. He was destined for the profession of the law, and was for some time employed in the office of one of the attorneys of Aberdeen. He afterwards proceeded to Edinburgh, where he in vain attempted to procure the means of livelihood. He went afterwards to Manchester, and obtained employment as clerk to a manufacturer. He went thence in 1771 with introductions to people of some influence in London. Among the friends who had made him general promises of assistance in procuring a situation was Mr. Urquhart the bookseller. Perry had in the mean time dropped some anonymous contributions into the letter-box of the 'General Advertiser,' which duly appeared in its columns. In one of his visits to Urquhart, that gentleman pointed to an article in the 'General Advertiser,' and told Perry that if he could write like that he would at once procure an engagement. The delighted aspirant claimed the article as his own, and was immediately engaged as a stipendiary contributor both to the 'General Advertiser' and the 'Evening Post.' Becoming subsequently editor of the 'Gazetteer,' he systematised the method of rapid reporting, by establishing the employment of relays of reporters, which has made so marked a change in the system of reporting. He became afterwards joint proprietor and editor of the 'Morning Chronicle,' to which he communicated a decided Whig spirit. He died at Brighton, Dec. 6, 1821.

PERSE'A GRATI'SSIMA is the *Avocado Pear* of the West Indies. The tree is about the size of an apple-tree. The fruit is the size of a

large pear, and is regarded as one of the best produced in the West India Islands. In the inside it is yellow, and contains a kernel inclosed in a soft rind. In taste it is said to resemble the peach, but to be much more agreeable, though not so sweet. It is sometimes eaten with pepper and salt, but more frequently with a little sugar and lime-juice. Three varieties are mentioned, the red, the purple, and the green.

PERSE'POLIS is mentioned by Greek writers after the time of Alexander as the capital of Persia. The name however does not occur in Heródotus, Ctesias, Xénophon, or Nehemiah, who make frequent mention of Susa, Babylon, and Ecbátana. There was a palace at Persepolis, which was burnt by Alexander the Great. Persepolis appears to be a different place from PASARGADÆ.

The remains of Persepolis, usually called Tchil-Minar, that is 'the forty pillars,' are described at length by Sir R. K. Porter in his 'Travels' (vol. i., p. 576). They are situated in an extensive plain near the union of the Bendemir and the Kur.

PERSEUS, son of Philip V., king of Macedonia, began at an early age to serve in his father's army, and he succeeded him on the throne in B.C. 179. Perseus was brought up with hostile feelings towards the Romans, who had humbled Macedonia; and though he confirmed the treaty made between his father and the Roman senate, he made preparations for war. In B.C. 172 the Roman senate declared Perseus to be an enemy, and the consul P. Licinius was sent with an army to Macedonia. Perseus had a conference with Q. Marcius, one of the Roman commissioners who were sent to Greece to urge the Roman allies to take up arms against the King of Macedonia; and he obtained from Marcius permission to send ambassadors to Rome to explain things to the senate. The Macedonian ambassadors went to Rome, but they were sent back by the senate without a satisfactory answer, and P. Licinius began the campaign in Thessaly in B.C. 171. Nothing decisive was done in this year or in the following. The consul Hostilius Mancinus made an unsuccessful attempt to invade Macedonia; and the exactions of the Roman officers in several parts of Greece indisposed many cities against the Romans, and inclined them to the side of Perseus. Chalcis in Eubœa, though in alliance with the Romans, was plundered by them. The people of Abdéra, who had been required to furnish money and corn for the Roman army, asked for time; but the town was entered by the Romans, the powerful citizens were beheaded, and the rest sold as slaves. The senate however redressed this monstrous wrong as far as they were able. (Livy, xliii. 4, 7, 8.) The Roman commissioners to the states of Epirus, Ætolia, and Achæa, acted with less violence, but with equal dishonesty. In B.C. 169 the consul Q. Marcius entered Macedonia, and got possession of the defile of Dium. In B.C. 168 Paulus Æmilius had the command against Perseus. He advanced from Thessaly to Pydna in Macedonia, where he defeated Perseus in a decisive battle, and the kingdom fell into the hands of the Romans. Perseus fled to Pella, the ancient residence of the kings of Macedonia, and at last took refuge in the island of Samothrace. Here, being deserted by all about him, he surrendered to the Romans, with his eldest son Philip. The King of Macedonia was compelled to pass through the streets of Rome with his children to grace the triumph of Paulus Æmilius. He was afterwards confined at Alba, in the mountains of the Marsi, near the lake Fúcinus, where he died in a few years. His son Philip died at the same place. A younger son is said to have become a scribe or writer to the municipality of Alba.

PERSEUS (constellation). This constellation is surrounded by Andromeda, Aries, Taurus, Auriga, Camelopardalus, and Cassiopeia. Of the two principal stars α and β (the latter of which is called Algol), the former is situated in the breast of the figure, the latter in the head of Medusa, which he carries in his left hand.

PERSHORE. [WORCESTERSHIRE.]

PERSIA, or PERSIS, called in the Old Testament Paras, and by the Arabic and Persian writers, Fars, or Farsistan, is used in two significations: first, it is applied to the country originally inhabited by the Persians; and secondly, to the various countries in Asia included in the Persian Empire founded by Cyrus, which extended from the Mediterranean to the Indus, and from the Black Sea and the Caspian to the Persian Gulf and the Indian Ocean.

Persis Proper was bounded on the north and north-west by Media, on the south by the Persian Gulf, on the east by Carmania, and on the west by Susiana, from which it was separated by rugged mountains. The country included within these limits is, according to Chardin's estimate, as large as France. The southern part of it near the sea-coast is a hot sandy plain. The interior of the country towards the north is intersected by numerous mountain-ranges, and this part was the original seat of the conquerors of Asia, where they were inured to hardship and privation. There are some well-watered and fertile plains, in the largest of which Persepolis is situated. [PERSEPOLIS; PASARGADÆ.]

PERSIA, a large country in Asia, called *Iran* by the natives. It lies between 25° and 40° N. lat., and 44° and 70° E. long., constituting an elevated table-land, surrounded by mountain-ranges, which separate it either from the sea or from the low countries which inclose it on the east, north, and west. On the south the table-land, or rather the ranges which inclose it, come close to the Persian Gulf and the Indian Sea. On the east of the table-land are the extensive plains which are watered by the river Sind, or Indus. On the north are the plains which extend to the Aral Sea, the Caspian Sea, and the Caucasus. On the west are the plains drained by the Tigris and Euphrates. The surface of the table-land of Iran, with the mountain-ranges which inclose it, covers an area of about 1,200,000 square miles. The table-land is generally level, interspersed with low and rocky ridges. The level tracts are either covered with loose sand, or sand impregnated with salt. Along the interior base of the mountain-ranges are large tracts, the soil of which is generally fertile.

This extensive country is at present divided into three independent states. The western half of it constitutes the present kingdom of Persia, or Irán, and the eastern is divided between the States of Afghanistan and Beloochistan.

The modern kingdom of Persia extends between 25° and 40° N. lat., and from 44° to 62° 30′ E. long.; it borders on the east on the kingdoms of Afghanistan and Beloochistan, on the north on the Russian and Turkoman dominions, and on the west on Asiatic Turkey. According to a rough estimate, the surface of the kingdom of Persia is 500,000 square miles.

Surface and Soil.—The mountain-range at the north-east corner of Persia is called the Mountains of Khorasan. It is in some places 200 miles wide, and has peaks from 4000 to 5000 feet above the sea-level; it is crossed by numerous minor ridges, the valleys of which are drained by many rivers. Where the mountain-ranges approach the Caspian Sea and turn to the west, between 56° and 55° E. long., they probably occupy less than 60 miles in width, and have few high summits; but westward of this point commences the portion called the Elburz Mountains, which have many lofty summits, of which Mount Demavend is 14,600 feet high; and several of the peaks are covered with snow during the greater part of the year. The tract of country which extends along the southern side of the Elburz Mountains, and between it and the desert in the interior of Iran, may vary between 20 and 30 miles in width. It is for the most part stony and sterile; but in the valleys watered by the rivers Shahrud and Sefidrud it is fertile. The Elburz Mountains do not descend with a steep declivity towards the north, but are skirted by a hilly tract varying from 20 to 30 miles in width, furrowed by many valleys, in which there is much fine timber, and which are cultivated to a considerable extent.

The narrow tract of level ground which surrounds the southern extremity of the Caspian Sea, and goes under the name of the Plain of Ghilan and Mazanderan, extends from the mouth of the river Gourgan, which falls into the most south-eastern angle of the Sea, to the mouth of the river Astarah. This tract considerably exceeds 300 miles in length; the width varies from 5 to 30 miles; the level is very little above that of the Caspian Sea. In climate and productions this region bears an extraordinary resemblance to intertropical countries. The swampy tracts along the shores of the Caspian Sea are overgrown with saline plants and canes. In the interior are extensive forests, mulberry plantations, rice-fields, vineyards, orchards, orangeries, sugar-plantations, and cotton-plantations.

The western portion of the plain of Ghilan separates the Caspian Sea from the table-land of Azerbijan, which constitutes the most northern portion of the great table-land of Iran, and lies between 36° and 40° N. lat. and between 44° and 49° E. long. The general elevation of this table-land is 4500 feet above the sea-level. The table-land is bounded on the west by the numerous ranges of the Kurdistan Mountains, and by the Massula Mountains from Ghilan on the east; it is also diversified with other mountains, of which Mount Sevellan attains a height of 12,000 feet. Several of the levels between the mountains form extensive plains, among which that surrounding the lake of Urumiyeh is by far the largest. Though in several places traversed by narrow and low ranges of hills, which terminate at a small distance from the shores of the lake, the plain extends in general from 20 to 30 miles from it, and at Tabriz even 50 miles. This plain is in general very fertile. The climate of the table-land is cold in winter, but very temperate in summer.

The mountains of Kurdistan occupy a broad belt of country along the western edge of the table-land of Iran. Mount Ararat may be considered as standing at the northern extremity of the mountains of Kurdistan. [Ararat.] From its southern base mountains branch off to the south and south-west, which inclose the lake of Van; and the mountain-region then extends southward, with a width varying from 180 to 70 miles, till its termination in the mountains of Farsistan, about 30° N. lat. The northern portion of this extensive mountain-region is nominally subject to the Turkish emperor; but the nomadic tribes which inhabit it are independent under their hereditary chiefs. The mountain-system consists of several parallel ridges, between which are many narrow deep valleys, and a few plains fitted for pasturage. That part of the great plain traversed by the Euphrates and Tigris, which belongs to Persia, lies between the mountains of Kurdistan and the banks of the Tigris and Shat-el-Arab. It is about 100 miles long, and, on an average, 30 miles wide. The country which lies east of the Kurdistan Mountains, and between them and the Kuweer, or Salt Desert, belongs to the table-land of Iran. Its general elevation above the sea varies from 2500 to 6000 feet; it is a plain traversed by numerous ridges of rocky hills.

The mountain region of Farsistan and Kerman occupies the whole of Persia south of 30° N. lat., from the mouth of the river Tab to Cape Jask (from 50° to 58° E. long.), a distance of nearly 500 miles in length, and nearly 200 miles in average width. On the south it is washed by the Persian Gulf, and on the north it borders on the desert of Kerman. Along the shores of the gulf is a low and sandy tract, varying in width from 20 to 30 miles, the soil of which is impregnated with salt. At the back of this low tract is an elevated region called Sirhud, or cold country, the maritime tract being called Garmsir, or warm country. The Sirhud comprises many peaks from 7000 to 8000 feet in height.

The central desert of Persia, included between these several mountain ranges, extends from 40 to 350 miles in width from north to south; and in length it extends through 9° of longitude. The nature of this desert varies in different places. In some the surface is dry, and even produces a few of those plants which require a salt soil; in others we find a crackling crust of earth, covered only with a saline efflorescence. A considerable portion is marshy, and in certain spots sand predominates. In several parts of this desert rocks rise abruptly, though in general only to a moderate

elevation. These rocks, usually short ridges, inclose small oases or fertile spots where water and herbage are found.

Rivers and Lakes.—The table-land of Iran, together with the mountain regions which surround it on the north and south, is very sparingly watered. Only those parts of Persia which are included in the plains of Ghilan and Mazanderan, in the table-land of Azerbijan, and in the mountains of Kurdistan, are well watered. The rivers of Ghilan and Mazanderan have a short course, but they are usually navigable for some miles from their mouth, where the woods on their banks do not form an impediment. The most considerable river in the table-land of Azerbijan is the Sefidrud, Kizil Uzan, or White River, which enters the Caspian after a course of 350 miles. Two rivers, each running about 100 miles, fall into the lake of Urumiyeh; the Aji, which runs some distance north of Tabriz, and the Ighátu, which falls into the lake not far from the most south-eastern angle. Three of the rivers which drain the mountains of Kurdistan run between 200 and 400 miles: the Diáyálah, which joins the Tigris below Bagdad; the Kerkhah, which falls into the Shat-el-Arab, a few miles below Kornah; and the Karoon or Kuran, which joins the same river at the point near its mouth where it begins to divide into numerous branches.

As a great part of the soil of Persia is impregnated with salt, the few lakes which occur are salt also, except in Ghilan and Mazanderan, where there are several small lakes of fresh water. The most considerable of the lakes of Persia is that of Urumiyeh or Shahee (called Spauta by Strabo), which is more than 80 miles long, and 27 miles wide; its greatest depth is only four fathoms, and its water is intensely salt. Another salt lake is that of BAKHTEGAN.

Climate and Productions.—The climate exhibits every variety, from the snows and severe cold of the mountain deserts to the almost torrid summer heat of the plains. Agriculture is well understood and carefully attended to, as is evident from the means of irrigation employed, and especially the subterraneous aqueducts. Rice, wheat, and barley are the most usual crops, but there are also millet, maize, tel, or sesamum, dal, a species of vetch, and several kinds of beans and peas. Cotton, indigo, sugar, tobacco, and madder, are raised in many places, but especially in Mazanderan. Fruit trees and garden vegetables are cultivated in great plenty.

The domestic animals of Persia are camels, horses, asses, mules, black cattle, buffaloes, sheep, and goats. The Persian horses are noted for their beauty, strength, and speed, especially those of the Turkoman tribes. Asses are numerous, and some of them of superior size and strength. Mules are used for the transport of goods more than any other animals. Wild animals are still numerous in the less populous districts of Persia.

Iron is abundant in many places, but it is not much worked. Lead, copper, antimony, rock-salt, and bitumen, are among the mineral products of the country.

Inhabitants.—The population of Persia is variously estimated at from 7,000,000 to 15,000,000 No trustworthy materials exist for determining it. Those of the inhabitants who have fixed abodes are Persians, Parsees, Armenians, and Arabians; the wandering tribes are chiefly Iliyats and Kurds.

The *Persians* constitute the bulk of the population, and are merchants, agriculturists, and manufacturers. The number of the *Parsees* is small; and they appear to be numerous only in the oasis of Yezd. Their language differs considerably from that of the Persians; they are not Mohammedans, but adhere to the religion of Zoroaster, as it is contained in the Zend Avesta, and adore fire as the symbol of the divinity. They are distinguished by the purity of their life and their honesty in all transactions, and occupy themselves mostly with agriculture and the raising of fruits. The *Armenians* live in all the great towns, where they are merchants. *Arabians* form the bulk of the population in Dushtistan, or Gurmsir, where they gain their livelihood as fishermen, seamen, planters of date-trees, and merchants.

The wandering tribes of Persia are comprehended under the general term of *Iliyats* or *Ilat*, and are found in every part of Persia; but many of them have become inhabitants of towns. A considerable number of them adhere to their original mode of life, and live all the year round in tents, in the winter keeping to the plains, and in summer seeking the pasture of the mountains. The wealth of the wandering tribes consists in cattle. The most numerous tribe of these tribes are the Lurs, who inhabit that portion of the mountains of Kurdistan which lies south of 34° N. lat., and comprehends the province of Luristan, together with the mountainous part of Khuzistan. The Iliyats acknowledge a limited peculiar allegiance to the Shah.

The *Kurds* are in possession of a large tract of the mountain-region of Khorasan, on the northern border of the table-land of Iran. Their character and mode of life resemble those of Kurds farther west. [KURDISTAN.] To the south-east of these Kurds, between the towns of Mushed and Herat, there is a tribe of Arabs who preserve their pastoral habits.

Besides these tribes, which almost exclusively occupy large tracts of country, there are others which are dispersed over other parts, but constitute only a small portion of the population. Among them are the Lak, the Kajar, the Afshar, the Shegaji, and the Shah-seven tribes.

Political Divisions, Provinces, and Towns.—The provinces of Persia are at present twelve in number. Seven lie along the western boundary-line: Azerbijan, Kurdistan, Luristan, and Khuzistan, along the border of the Turkish Empire; and Farsistan, Laristan, and Kerman, along the shores of the Persian Gulf. The interior of Persia is occupied by the two large provinces of Irak Ajemi and Khorasan; and along the shores of the Caspian Sea extend the provinces of Ghilan, Mazanderan, and Astrabad.

1. *Azerbijan.* This province is separated in the north from Armenia by the river Araxes, in the east from the table-land of Irak Ajemi by the Kizil-Ozein, towards the south and

west it borders on Kurdistan and Turkish Armenia. The chief rivers are the Araxes [ARAS] and the Kizil-Ozein; besides which there are the Jagatty, Yezdican, Aji, Shar, and Kara-Su. The large salt lake of Urumiyeh is in this province. The alterations of temperature are considerable; but the climate is healthy.

The most flourishing part of Azerbijan is that along the northern and western border of the lake of Urumiyeh, from Tabriz to the confines of Armenia. Selmâs is now a town of about 2000 inhabitants, most of whom are Nestorian Christians. Khoi is described by Kinneir as one of the finest and best-built towns of Persia: its walls are in good repair, the streets are regular, shaded with avenues of trees, and the ceilings of many of the houses are tastefully painted. The town of Urumiyeh is situated on the S.W. side of the lake to which it gives its name: its population is 12,000. Maragha, a town of about 15,000 inhabitants, is situated in a low valley; it is celebrated in Oriental geography for the observatory of the celebrated astronomer Nasir-Eddin, ruins of which still exist.

The principal town of Azerbijan is Tabriz, situated in 46° 8′ N. lat., and 38° 4′ E. long. The number of its inhabitants, which was at one time much greater, is at present about 30,000. Its situation, near the confines of the Persian and Turkish dominions, sufficiently accounts for its present desolated condition, as the town has been subject to frequent conquests and devastations. It has, moreover, repeatedly and most severely suffered from earthquakes. Miannah is situated in a long and winding valley on the western side of the Kafian-Kuh. It was nearly ruined by the Russians in their invasion of Persia some years ago, and is now a poor village. The ruins called Kalah Zohak, are situated on a precipitous rock near the river Karangoo. Ardebil is situated at the eastern descent of the high Sevellan Mountains. Towards the north of the town there is a fertile plain with excellent pastures.

2. *Kurdistan*, in its general acceptation, has been noticed in a separate article. [KURDISTAN.] The chief towns in Persian Kurdistan, not described in that article, are Sehuah and Kermanshah. Sehuah is the residence of a Kurdish chief, who lives in a sumptuous palace, built on a small hill in the middle of the town. The town contains about 5000 families. Kermanshah, a flourishing town, is situated in the southern extremity of a fine plain, through the centre of which runs the Kara-Su, an affluent of the Kerkhah. It contains about 12,000 houses, and has many public buildings. It carries on a considerable commerce. Near it are the excavations and sculptures of Besittoon and Takt-i-Bostan.

3. *Luristan*, which lies between the Kerkhah and the Dizful, is entirely occupied by mountains and narrow valleys, except some plains of moderate extent near the outer ridges of the mountain region. There is no town in this province, except Khorrâm-abad, which contains about 1000 houses, and is built on the south-western face of a steep rock, on which a strong fortress and palace are erected.

4. *Khuzistan* comprehends the southern part of the mountains of Kurdistan and that part of the plain of the Tigris which belongs to Persia. It is mostly in the possession of Arab tribes. The town of Dorak is a large place, the walls of which are two miles in circumference. This town is celebrated for its manufacture of Arabian cloaks. Endian, which is situated near the most southern extremity of the province, has some trade with Bâsra, or Bassora, and from 4000 to 5000 inhabitants. Dizful, on the river of the same name, is a considerable place, with 20,000 inhabitants, and a fine bridge over the river. About 10 miles south-west of this town are immense heaps of ruins, on both sides of the river Kerkhah, which mark the site of Susa. Shuster stands not far from the high mountain-ranges on the river Kuran. The houses are good, being principally built of stone, but the streets are narrow and dirty. There is a considerable manufacture of woollen stuffs. The population is about 15,000. The mountains east of Shuster contain ruins of many ancient buildings.

5. *Farsistan*, or *Fars*, the ancient Persis, comprehends nearly one-half of the Dushtistan, a low, hot, sandy strip which extends along the shores of the Persian Gulf, the northern portion of the mountain-region of Farsistan and Kerman, and the hilly plain which extends north-eastward to the lake of Bakhtegan and the Great Desert. The southern part of the coast, east of Ras (Cape) Berdistan, is occupied by Arabs, who acknowledge the authority of the Iman of Muscat; and in the northern districts there are some tribes of Kurds. Near the coast are the towns of Congoon (6000 inhabitants), and Abushire or Bushire. [ABUSHIRE.] The principal towns in the interior, from west to east, are Behaban, Kazerun, Shiras, Firoze-abad, and Darabgherd; these towns contain, respectively, 10,000, 4000, 60,000, 5000, and 20,000 inhabitants. Shiras, or Shiraz, is by far the most important among them. It is the capital of the province, and was for some time the residence of the kings of Persia. It is six miles in circumference, but a great part of the area is covered with ruins. The houses are generally small, and the streets narrow and filthy. None of the edifices are remarkable for antiquity or beauty, except the great Bazar, or Bazar-i-Wukell. This town carries on a considerable trade with Yezd, Ispahan, and Bushire; and has manufactures of cotton, glass, iron, gunpowder, swords, and wine. Shiras is also distinguished for the otto of roses procured from the rose-gardens in the neighbourhood.

In no part of Persia is the number of ruins so great as in Farsistan. The most remarkable are those of Persepolis [PERSEPOLIS]. The others are situated at or near Shapur, Mourghab, Naksh-i-Roostan, Naksh-i-Rejib, Feroze-abad, and Darabgherd.

6. *Laristan* occupies the country between Cape Berdistan and the Island of Kishm, and consists of the Dushtistan, or the low tract along the sea, and a hilly country. The capital, Lar, is at the foot of a range of hills, in an extensive plain, which is covered with palm-trees. It contains

about 12,000 inhabitants, and is celebrated for the manufacture of swords, muskets, and cotton cloth. The bazar is the noblest structure of that kind in Persia. Tarun is as large and populous as Lar, but meanly built; it carries on a considerable commerce with Muscat, Gombroon, and Shiras.

7. *Kerman* occupies the south-eastern part of Persia. The greater part of it is little known to Europeans; but the district between Minâb and Sereek is so very fertile and beautiful, as to have obtained the name of the Garden of Persia. Another fine district is the Nurmanshir, about 90 miles in length, and from 20 to 30 miles wide, in which are several small towns, surrounded by large orchards and extensive cultivated grounds, and comparatively small sterile tracts. The town of Kerman, which was destroyed in the civil wars of Persia in 1794, still contains a population of 20,000 persons. The trade and manufactures are considerable. The bazar, which is extensive and well built, is abundantly supplied with articles of every description; and there are nine large caravanserais within the walls, and a number of inferior ones both within and without. Opposite the town of GOMBROON, and about 9 miles from it, is the island of Kishm, the largest in the Persian Gulf. It is 60 miles long, but the widest part does not exceed 12 miles. It contains about 100 small towns and villages, of which the chief are Kishm, Laft, and Bassadore. Near Kishm is the island of Ormuz.

8. *Khorasan* extends over a large part of the Great Desert, and over nearly the whole of the mountainous region which lies north of it. Among the towns are Gunahabad with 30,000 inhabitants, Bushrewgah with 20,000 inhabitants, and Tubbus with a still larger population. The most important town is Herat, the population of which is estimated at 45,000. The city occupies an area of four square miles, and is encircled with a lofty wall and wet ditch. It forms a square, and has a gate in each side. From each of the four gates a spacious bazar leads towards the centre of the city, where there is a small square, which, like the bazars, is arched at the top. There are 17 caravanserais, 20 public baths, many public reservoirs for water, and a great number of mosques. The manufactures and commerce are very considerable. Mushed or Meshed occupies a larger space than Herat, but many of the houses are uninhabited and in ruins. The population amounts to 45,000. The chief building is the mausoleum of Iman Reza; it is a large and magnificent structure, and kept in good condition. A silver gate, the gift of Shah Nadir, opens into the chief apartment, which rises into a noble dome and branches out into the form of a cross. The city has many mosques and sixteen medresses or colleges. The manufactures and commerce of the town are extensive. The town of Nishapoor, which was once a very large place, now contains only 8000 souls. In its neighbourhood are the famous turquoise mines. Sebsewar contains about 4000, Sharood 5000, and Bostan 4000 inhabitants. Kaboochan is a town of 20,000 inhabitants. Kelat Nadiree is a famous and almost impregnable fortress, in a deep valley.

9. *Irak Ajemi*, the largest of the provinces of Persia, comprehends a considerable portion of the Great Desert and the countries which inclose its north-western extremity. The chief town, Yezd, is very large, containing about 8000 houses and 50,000 inhabitants, among which 3000 or 4000 families are Guebres, or fire-worshippers. Yezd is remarkable as a commercial and manufacturing town. Its commercial importance arises from the caravan routes, which here cross one another, and thus connect it with all parts of Asia. Ispahan, though fallen from its greatness, is still the most populous city in Persia; it has more than 100,000 inhabitants. It stands on the banks of the river Zeinderud. The mud walls are 24 miles in circuit. The streets are crooked, narrow, and dirty, and unpaved, like those of most Persian towns. Ispahan contains a great number of magnificent palaces, large private buildings, spacious caravanserais, and handsome bazars, most of which however are now in a state of decay. On the southern side three nobly-constructed bridges cross the river. The Maidan Shat, or Great Square, and the bazar of Shah Abbas, are both going to decay. The most sumptuous of the palaces is the Chehel Sittoon, with its hall of columns inlaid with mirrors so as to resemble pillars of glass. Near the town is the suburb of Julfa, which is inhabited by Armenians, and contains a population of 12,500. The commerce and manufactures of Ispahan are both large. Kashan, Zenjan, and Casbin, are large and flourishing towns of this province. Koom, Khonsar, and Sultaniyah, are towns which have fallen partially to decay. For Hamadan, see ECBATANA. The chief town of this province is Teheran, the capital of Persia and seat of government. The town is about four miles in circumference, surrounded by a strong and high mud wall with numerous towers and a dry ditch. The streets are narrow and crooked; the houses are built of sun-dried bricks, and are mean, with the exception of a few palaces. The only building of consequence is the citadel, which contains the palace of the sovereign and his officers; but these buildings are much inferior in magnificence and beauty to the palaces of Ispahan. The population varies from 70,000 to 100,000, according to the presence or absence of the court. In the neighbourhood are the royal country-houses called Takht-i-Kujeriah and Nigahristan, and the ruins of Rai, the Rhagæ of the ancients, and once the capital of the Parthian Empire.

10. *Ghilan* comprehends the western portion of the low plain which surrounds the southern shores of the Caspian Sea. There are no villages in this country, the peasants residing either in single dwellings or in small communities seldom exceeding eight houses. In some places there are bazars, which, as well as the small clusters of huts, are situated in the midst of the forests or plantations of mulberry-trees. Resht, the capital of Ghilan, one of the most commercial places in Persia, has water communication with the Caspian. The population is variously stated between 50,000 and 80,000. The houses are of a superior construction, and the streets well paved. Enzillee is a port and Lahijan a busy town in this province.

11. *Mazanderan* comprehends the largest and widest portion of the low plain along the shores of the Caspian Sea. The most western town is Amol, mainly built on the western banks of a small river, the Herhaz, in a very irregular way, the houses being dispersed, and inclosed by orchards and groves. It contains from 35,000 to 40,000 inhabitants. Farther east is Balfrush, one of the busiest towns in Persia, with a population of about 20,000. Mushed-i-Sir, Saree, and Farahabad, are also active commercial towns in this province. A good road was made by Shah Abbas through Mazanderan.

12. *Astrabad* comprehends the eastern portion of the low plain extending along the banks of the Caspian Sea, and the hilly country contiguous to it on the south. Its chief town is Astrabad; but neither this nor any other of the towns are important.

Manufactures and Commerce.—The manufactures of Persia are numerous and of various kinds. In the manufacture of some articles the Persians are still distinguished, as in several kinds of silk stuffs, especially brocades, and sword-blades, leather, carpets, felt of camel-hair, and jewellery. No machinery being used in the Persian manufactures, the cotton and silk goods introduced by the British have obtained a ready sale owing to their cheapness.

The internal commerce of Persia is very considerable. The different regions which compose this extensive empire differ considerably in their natural productions, and the transport alone of commodities gives occupation to a great number of merchants and other people. To this must be added the produce of the manufactures, and the numerous articles which are brought into Persia from the neighbouring countries, especially from India, and are distributed all over the country. This commerce is entirely carried on by caravans; which usually comprise a very large number of persons and animals of burden, and have regular defined routes across the empire in various directions. The value of the British and Irish produce and manufactures exported direct to Persia, in 1846, was only 3091*l.*; but the value through other channels must have been much greater.

Government.—Persia is an absolute monarchy, in which the will of the sovereign is not, as in almost all the monarchical states of Europe, controlled and limited by institutions which have existed for a long time, and which cannot be infringed without exciting universal discontent. Institutions and a political order of this kind formerly existed, but they have been annihilated in the continual intestine wars which have desolated Persia during the last century. In Persia the word of the king is law, and the life and property of the subject are in his hands. He delegates his power to the governors of provinces, reserving to himself the power of life and death. The governors of the provinces are called sardars, and those of smaller districts kulombegs. There are two different kinds of courts in Persia, the shorrah courts and the urf courts. The former decide matters according to the Koran and the traditional commentaries on it; the second, according to the customary laws of Persia. The supreme judge in the shorrah courts is the Sheik-al-Islam, who decides matters in the last instance, aided by the advice of the mooshteheds, or chief pontiffs. In every town there is such a judge, and in the larger ones also a cauzee, who is aided by a council of mollahs.

Language and Literature.—The history of the language of Persia, like that of the empire, may be divided into various periods, since, under each of the dynasties of which we have any remaining monuments, there was apparently a change in the dialect of the kingdom. It has been supposed, though not without dispute, that the Zend was the prevailing dialect in the infancy of the empire; but the Zend must have fallen into disuse at a very early period, since, in order to propagate the religious tenets of the 'Zend Avesta,' the priests deemed it necessary to have the work translated into Pehlví. As to the Pehlví, it was at first spoken nearly at the same time with the Zend, and attained to a high degree of perfection under the Sassanian kings. Indeed it was the common language of the nobility and the court until A.D. 351, when it gradually fell into disuse, and made way for the Parsí, or the idiom of Parsistán (Persia Proper). It is believed that the Zend, as well as the Parsí, has a common origin with the language of the Brahmans, while the Pehlví is closely related to the Chaldaic. After the conquest of Persia by the Arabs, Mohammedanism became the prevailing religion, and Arabic by degrees the language of the learned. At first it was cultivated for the purpose of reading the Korán. The addition not only of words, but of whole sentences, soon became a necessity; and thus the modern Persian arose out of a combination of Parsí with Arabic. The modern Persian, though neither so rich nor so expressive as the Arabic, is more harmonious and better suited to all kinds of poetry. The prophet Mohammed was once heard to say that 'the language of Persia would be spoken in Paradise, owing to its extreme softness.' In the simplicity of its grammar it has been compared with the English; in its power of compounding words, with the German. The characters are the same as the Arabic, with the addition of four letters with three points. The Persian books are generally written in the sort of hand called *taalik*; although it is not uncommon to meet with works written in the *neskhi*, as the hand used by the Arabs is commonly called.

The literature of which the Magi were in possession, until the introduction of Islám, has scarcely anything to show in its old dialects, the Zend and the Pehlví, but such parts of the books of Zoroaster as have been preserved, the commentaries upon the same, and the Persepolitan inscriptions, which are for the most part unintelligible. As to the Derí or Parsí, after it became the language of the court, it was very much cultivated by the Sassanian kings and their vizirs, many of whom published works in it. During the first two centuries after the Mohammedan conquest, Persian literature was very little cultivated under the khalifs, who gave the preference

to the Arabian. But when the power of the Abbasides began to decline, a number of independent princes arose in the different provinces of their empire, who vied with one another in promoting the cultivation of letters. This flourishing state continued until the beginning of the 13th century, when the invasion of Gengis-Khán gave a violent shock to all the arts of peace. The Tartar and Turkoman dynasties rather encouraged than depreciated Persian literature. In the 16th and 17th centuries, under the bloody reigns of the sultans of the house of Sofi, Persian literature sank to the lowest state; even the language was corrupted, and borrowed some of its terms from the Turkish, which was commonly spoken at court. Literature however seems to have somewhat recovered of late years. The works of Sir W. Jones and Von Hammer may be advantageously consulted for a notice of the chief Persian writers and writings. We may also refer to the articles ANWARI, AYEEN AKBERY, FERISHTA, FIRDUSI, HAFIZ, HAUKAL, NADIR SHAH, NASIR-ED-DIN.

Religion.—Our knowledge of the religion of the ancient Persians is principally derived from the 'Zendavesta,' or sacred books of the Persians. We learn from these books that the inhabitants of the ancient Iran, which comprised Cabulistan, Sogdiana, Bactria, Media, and Persia, were originally one race of people, who spoke the same language, and believed in the same religion. It was among them that Zerdusht, commonly called Zoroaster, arose, who must probably be regarded rather as a reformer of the ancient religion than as the founder of an entirely new system. His religious system became the dominant religion of Western Asia from the time of Cyrus to the conquest of Persia by Alexander the Great. Under the Macedonian and Parthian monarchies, the doctrines of Zoroaster appear to have been considerably corrupted by the introduction of foreign opinions; but on the re-establishment of the Persian monarchy by Artaxerxes in the third century of the Christian æra, great exertions were made to restore the religion of the Persians to its primitive purity. The exercise of every other worship was strictly prohibited, and the religion of Zoroaster again became the dominant faith of the East, till the conquest of Persia by the Arabs in the seventh century. Those who refused to abandon the religion of their ancestors fled to the deserts of Kerman and to Hindustan, where they still exist in the present day under the name of *Parsees* or *Farsis*, a name derived from Pars or Fars, the ancient name of Persia.

There are a few followers of the ancient religion existing in the present day in Persia, but they are in a degraded and oppressed condition. At Bombay however the Parsees are a very active and rich class, and they bear a high character, morally and intellectually.

History.—At the earliest period of which any trace is preserved, Persia appears to have formed a province of the great Assyrian Empire, on the disruption of which it fell under the power of the Medes. Cyrus established an ascendancy over the Medes in 560 B.C., and founded a powerful Persian kingdom.

On his death the kingdom was usurped by a Magian, who personated Smerdis, the brother of the deceased monarch: but this impostor was destroyed by the nobles, who raised to the throne one of their own body, Darius Hystaspes. In his reign (521–485) the empire was divided into satrapies, and regular taxes introduced: Babylon revolted, and the walls were destroyed: and though a Persian expedition, under the command of Darius himself, against Scythia, was a failure, the acknowledgment by Macedonia and Thrace of Persian supremacy extended the empire into Europe. During the reigns of the succeeding kings, especially those of Xerxes, Artaxerxes, Darius II., and Cyrus II., Persia was frequently at war with its dependencies in Asia, with Egypt, and with Greece. The Persians were defeated by the Greeks in the battles of Marathon (490 B.C.), Salamis (480), Platæa and Mycale (479); and Egypt shook off the Persian yoke in 414 B.C., and remained independent for 60 years.

In the time of Alexander, by three great battles (Granicus, 334; Issus, 333; and Arbéla 331), the Persian Empire was utterly overthrown; and the unfortunate Darius, flying from the arms of Alexander, was murdered (330) by his own servants, while the whole extent of his dominions from the Hellespont to the Indus fell under the sway of the Macedonian conqueror.

On the death of Alexander (323) and the dismemberment of his vast territories by his generals, Persia fell to the lot of Seleucus Nicátor. The Seleúcidæ reigned from 312 to 248 B.C.; and were succeeded by the Arsácidæ, who founded the Parthian kingdom, which gradually acquired great extent and power, but declined as the Roman power advanced: it lasted from 248 B.C. till 226 A.D.

The erection of the Sassanian dynasty commences a new æra in the history of Persia (which ancient appellation henceforward replaces that of Parthia). Its chief kings were Artaxerxes, Shahpoor, Narses, Shahpoor II., Bahram V., Khosru Nusherwan, and Togrul III. The dynasty lasted from 226 A.D., till 641 A.D. During the greater portion of this period, the Persians were at war, first with Rome, and then with the Constantinopolitan emperors; there were also repeated contests with the surrounding Asiatic nations and tribes. The dynasty was at its height of power and extent during the long and brilliant reign of Khosru Nusherwan, 531 to 579 A.D. [KHOSRU I.]

The Arabs early attacked Persia after the rise of the Saracenic power; and the Sassanian dynasty was put an end to in 641 A.D., by the battle of Nehavend, in which King Yezdejerd was defeated. For more than two centuries after the Mohammedan conquest, the national history of Persia presents an entire blank. The Persians imbibed the religion and literature of the Arabs, to whom they imparted in return their civilization and luxury; but the country was only a province in the empire of the caliphs, and followed implicitly the revolutions of the Ommiyades and Abbasides. With the decay and division of the power of the Commanders of the Faithful, the spirit of independence revived, and the re establishment of

the kingdom may be dated from the foundation of the Soffarian dynasty by Yakub Ibn Lais. This dynasty lasted from 868 to 900; and was succeeded by the Tartar Samanides dynasty (900 to 936); and a native dynasty (936 to 1028). The Seljookian Turks, among whom were the distinguished kings Togrul-Beg and Alp-Arslan, ruled Persia thence till 1194, when the Kharismians held the reins of power for a short time. The famous mogul Gengis Khan established a new dynasty, which ruled Persia till 1381, in which year the Tartars under Tamerlane conquered the country, and established a rule which extended, with few interruptions, till 1502.

Ismael Shah, the founder of the Sefi, Sooffee, or Seffavean dynasty, was remotely descended from the caliph Ali, the cousin and son-in-law of Mohammed. He was a Turkoman, but he belonged to a different religious sect from the Turks usually so called, and hence the national hostility which has subsisted between the Sheah and Sooni, or Persian and Turkish Mohammedans. This dynasty lasted from 1502 till 1736; it included the distinguished name of Abbas the Great, under whom the Persian Empire regained much of itt former extent and splendour. The Sefi dynasty was put an end to by Nadir Shah, in 1736, at whose death, in 1746, the empire was plunged into civil discord, which continued till 1795, when the Kajar dynasty was founded, which still exists.

PERSIAN GULF, a large closed sea, connected with the Indian Ocean. The entrance from that sea is by the Strait of Ormuz, which in the narrowest point, between Ras Koli (or Cape Koli), in Persia, and Ras Mussendom, in Arabia, is about 38 miles wide. The gulf extends between 24° and 30° N. lat., and between 48° and 58° 30′ E. long. Its general form is that of a curve, the convex side of which is turned to the south-east. The greatest length in a straight line is about 550 miles; the width varies from 40 to 200; the area is 70,000 square miles.

The navigation of this sea is in many parts dangerous and difficult, especially on the southern shore, owing to the numerous shoals and reefs. The places which are most resorted to by shipping are the anchorage between the island of Ormuz and the town of Gombroon, the small bays of Mogoo and Bender Chetwar, the roadsteads of Bushire, and, north of that town, the bay of Jenabe and Ras Dilem.

The most remarkable of the numerous islands which are dispersed along the shores of the gulf are Ormuz, Kishm, Kaës, Busheab, Bahrein, and Karej. Kishm is the largest island in the gulf, being 54 miles long, and in the broadest part 20 miles wide. The population exceeds 5000. Kishm, the capital, at the eastern extremity of the island, is a place greatly resorted to by native vessels. [BAHREIN.] The islands of Kaës, Busheab, and Karej are small.

Fish abound along the shores of the gulf; and fish and dates constitute the principal articles of food of the population. Nearly the whole population of the Arabian shores of this sea get their means of subsistence by the pearl-fishery. The most extensive pearl-fisheries are those on the several banks not far from the island of Bahrein. The shores on both sides of the gulf, whether belonging to Persia or Arabia, are mostly inhabited by Arabs.

PERSICA'RIA is the garden name of *Polygonum orientale*, a handsome annual, growing about six feet high, and strikingly ornamented with drooping clusters of pink flowers.

PERSIMON is the fruit of the *Diospyrus Virginiana*, a tree inhabiting the United States of America, especially the southern, where it becomes 60 feet or more in height, with a trunk 18 or 20 inches in diameter. It has a succulent reddish fruit about as large as a small plum, and containing a few oval stones. After having been exposed to frost, it becomes sweet, but, like our medlars, is astringent and uneatable at an earlier period. It is eaten both by man and by wild and domestic animals; it is also pounded, dried, and made into cakes, or it is bruised and fermented, and yields by distillation an ardent spirit. The timber is strong, elastic, and of considerable value. The bark, which is very bitter, is said to be tonic.

PERSIUS, AULUS FLACCUS, a Roman satirist, was born at Volaterræ, a town of Etruria, about the 20th year of the reign of Tiberius, A.D. 34. He was of equestrian rank. At the age of sixteen he became a pupil of the Stoic, Annæus Cornutus, and had the poet Lucan for his fellow-disciple. Persius died at the age of twenty-eight or thirty as some suppose. He left six short Satires, which bear the stamp of his peculiar studies, and show a high moral character. The Satires are somewhat obscure. There is an edition, with a very elaborate commentary on them, by Isaac Casaubon, London, 1647; and there are many subsequent editions. The English translations are numerous: that of Gifford is perhaps the best.

PERSONAL PROPERTY. [CHATTELS.]

PERSPECTIVE is the name given to the branch of art in which the rules for correct drawing are laid down. It is usually divided into *Linear Perspective*, in which form and outline alone are considered; and *Aerial Perspective*, in which the effects of the atmosphere, &c., on distinctness are considered. But what is commonly meant by the word is that which appertains to linear perspective. It is impossible, in a short article, to enter upon the subject in detail. The student may consult the article in the 'Penny Cyclopædia,' or one of the numerous elementary works on the subject.

PERSPIRATION. [SKIN.]

PERTH. [PERTHSHIRE.]

PERTHSHIRE, a large and central county in Scotland, lying between 56° 2′ and 56° 57′ N. lat., and between 3° 2′ and 4° 50′ W. long. It is bounded N. by the shires of Inverness and Aberdeen; E. by Forfarshire; S.E. by Fifeshire and Kinross-shire; S. by Clackmannan and Stirling shires; S.W. by Stirling and Dumbarton shires; W. by Argyleshire; and N.W. by Invernessshire. Its greatest length from N. to S. is 53 miles; from E. to W. 62 miles. The area is 2588 square miles. The population in 1841 was

137,390. A small detached portion of the county lies on the N. shore of the Frith of Forth, and another is surrounded by Stirlingshire; while a small detached portion of Forfarshire is included in the boundaries of Perthshire.

Surface, Rivers, &c.—The whole of the county except the immediate vicinity of Perth is hilly, if not mountainous. The Ochill Hills or Mountains traverse the S.E. part between the Forth and the Tay; they rise in some parts to an elevation of more than 2300 feet above the level of the sea. The Grampians form the N. and N.W. boundary of the county. The western half of the county is overspread by the mountains of the Western Highlands, among which Ben Lawers has a height of 3945 feet. The Sidlaw Hills are on the eastern side of the county near Forfarshire. These various mountainous districts are intersected by long winding narrow vales, or 'glens,' through which the streams flow, or by 'straths,' or wider valleys. Strathallan, in the S. part of the county, separates the Ochill Hills from the mountains of the Western Highlands; Strathearn extends across the centre of the county from W. to E.; Strath Tay, and lower down Strathmore (which last extends into Forfarshire, or rather through it), form the valley of the Tay; and Strath Airdle is in the north-eastern part of the county. In the northern part of the county are Glen Shee and Glen Beg, Glen Fernal, Glen Tilt, Glen Bruar, and Glen Erochkie. In the west are Glen Lyon, Glen Lochy, Glen Dochart, Glen Falloch, and Glen Artney. Glen Tilt communicates with Strath Tay by the well-known pass of Killierankie.

This county is almost entirely comprehended in the basin of the Tay. A small portion on the south-west side, drained by the streams which flow into Loch Lomond, belongs to the basin of the Clyde; and the more important district of Menteith in the south is included in the basin of the Forth.

The Tay rises in a small loch or lake near the extreme western part of the county on the border of Argyleshire, and flows E. and E. by N. 20 miles, through Loch Dochart into Loch Tay, a narrow lake about 11 miles long, embosomed in mountains, and having Ben Lawers near its N.W. shore. From the N.E. end of the loch it proceeds to Perth. Its course below Perth is chiefly E., and, including the frith or æstuary of Tay, may be estimated at 26 miles; so that its whole length from the head of the Dochart to the open sea may be estimated at 105 miles. It is navigable to Perth for vessels of 100 tons, and to Dundee for large vessels. [DUNDEE.]

The tributaries of the Tay deserve notice from the system of lakes with which they are connected. The Lyon rises on the W. border of the country, and flows E. by N. through Glen Lyon 28 miles into the Tay. Not far from its source, it flows through Loch Lyon, which is about 2 miles long. The Tumel issues from the N.E. end of Loch Lydoch, a large irregular sheet of water, adjacent to the wild table-land of Rannoch-Moor, 1000 feet above the level of the sea, and flows eastward about 6 miles into Loch Rannoch, a long and narrow sheet of water, passing in its way through one or two smaller lochs. Two streams, one flowing into the Tumel, between Lochs Lydoch and Rannoch, and the other into Loch Rannoch itself, serve to convey to the Tumel the superfluous waters of Loch Ericht, another long narrow sheet of water, 14 miles long from N. to S. by one mile in breadth, and extending into Inverness-shire. From the eastern extremity of Loch Rannoch the Tumel flows eastward 10 miles into Loch Tumel, 2 miles long and half a mile broad, and hence 12 miles farther east and south into the Tay. Its whole course is nearly 40 miles. Between Loch Tumel and the Tay it receives on its left bank the Garry, which has a course of about 30 miles, flows through Loch Garry, a narrow lake 3 miles long, and waters Glen Garry. The Braan, or Brand, 20 miles long, waters Strath Braan, and serves as an outlet to Lochs Freuchie, Kennard, Skiach, and some others, all small. The Isla, one of the most important feeders of the Tay, belongs chiefly to Forfarshire. Of its tributaries, the Shee or Ericht belongs to Perthshire; it is nearly 30 miles long, and waters Glen Shee; it receives the Airdle, 20 miles long, which rises at the foot of Cairn Gower, in the Ben y Gloe mountains, and waters Strath Airdle. The Almond rises not far from the south-eastern shore of Loch Tay, and flows about 24 miles E. into the Tay. It has no lakes connected with it.

The Earn rises in the western part of the county, and flows E. about 5 miles into Loch Earn, which is 7 miles long by about one mile broad, and from thence 35 miles E. into the Tay below Perth. It waters Strathearn.

The district of Menteith in the south belongs to the basin of the Forth, and is watered by the Teith, which rises just within Argyleshire, and flows 4 or 5 miles, into Loch Cateran or Katrine, a winding and picturesque sheet of water, 8 miles long. The Teith flows into the Forth below Stirling. Its whole length is about 34 miles. The Allan and the Devon are tributaries of the Forth, which flows just upon or within the S. boundary of the county for about 30 miles, from the neighbourhood of Ben Lomond to below Stirling. The Falloch Water, which flows through Glen Falloch into Loch Lomond, is near the south-western border of the county. The aggregate area of the lakes of Perthshire is estimated at 50 square miles. There are several falls in the rivers of Perthshire. Those of the Bruar and the Tumel are very picturesque; and the falls and rapids of the Devon, called the Devil's Mill, the Rumbling Bridge, and the Cauldron Linn, are worth a visit.

Geology and Agriculture.—The N.W. and N. parts of the county belong to the great primitive district of the north of Scotland. Granite is found underlying the peat of the extensive waste of Rannoch Moor in the western part of the county; but the predominant rock in this district is mica-slate, skirted by clay-slate and chloride-slate, both which pass insensibly into mica-slate. A highly-elevated range of breccia may be traced in various places, separating the primitive district from the secondary district in the south-east of the county. The district to the S. and E. of the

breccia is occupied by beds of sandstone. Basaltic rocks may be traced in a N.E. direction, sometimes capping hills of sandstone, sometimes forming entire hills of considerable magnitude; and sometimes irregularly interstratified with sandstone beds. The Ochill Hills in the south-east part of the county consist chiefly of porphyry and amygdaloid; and the Hill of Kinnoul near Perth is an amygdaloid containing numerous nodules of agate and carnelian. Some portions of the county near the S.E. border are comprehended in the coal-field of Fifeshire. Owing to its mountainous character, a large portion of this county is ill-adapted for cultivation. There are very extensive tracts of moor, bog, and moss, though they are progressively diminishing. A large space is occupied either by natural woodlands or by plantations, chiefly the latter, for the ancient forests have been almost entirely destroyed. The plantations have been much extended of late years, and many districts have been covered with them. Oak, ash, birch, beech, elm, lime, alder, plane, and larch trees, are planted, though not so extensively as the fir tribe. The most valuable tract is the Carse of Gowrie, the district watered by the Isla and its tributaries the Erichť and the Airdle, and comprehending a portion both of Forfarshire and Perthshire. It is a low alluvial district. There is little cultivated land in the Highland districts.

The Carse of Gowrie, Strathearn, and the valleys of the Teith and the Forth yield good crops of wheat; but in the midland districts oats and barley are the principal grain crops. Turnip cultivation has been carried to a considerable extent, and bone-dust has been introduced as a manure for this crop; but lime, which is imported at Perth from the Frith of Forth, or the north of England, is chiefly employed. The chief article of agricultural produce is however the potato, of which great quantities are yearly shipped for London.

There is no breed of cattle peculiar to the county. The stock varies with the varying quality of the pasturage. Many Ayrshire cows for the dairy have been introduced of late years into the lowlands; and some of the best farmers have a cross-breed from the Teesdale or short-horned and the Ayrshire. The West Highland breed is that commonly fed on the Highland pastures. The number of sheep has been vastly augmented, chiefly by the alteration in the system of farming, and the laying-out of sheep-walks in the Highland tracks.

Manufactures.—The cotton and linen manufactures are very extensively carried on in the county: Stanley is the principal seat of the one, Dundee of the other. Woollens and silks are also woven, the latter at Perth.

Divisions and Towns.—The county is divided into two districts, each under a sheriff substitute; and is sub-divided into 10 smaller districts, each under the jurisdiction of a justice of the peace court. The county returns one member to parliament, and Perth returns another.

The following are the chief towns, with the population of each in 1841:—

Abernethy, a burgh of barony at the junction of the Earn with the Tay, 7 miles S.E. from Perth, is only remarkable for having been the capital of the Picts. Population of the village, 827.

Alyth is a burgh of barony, situated on a rivulet running into the Isla, about 6 miles N. by E. from Cupar Angus. Population of the town, 1846.

Auchterarder is a village consisting of one street about a mile long, 18½ miles S.W. from Perth by the Scottish Central Railway. Population of the village, 2068.

Blair-Athol, a village about 32 miles N.N.W. from Perth, is situated on the river Tilt, in a mountainous district. Population of the parish, 2032.

Blair-Gowrie is a burgh of barony, 4 miles N.W. from Cupar Angus, on the S. side of the Ericht. It is the seat of some thriving manufactures. Population of the village, 2242.

Callander is a village about 8 miles N.W. from Kincardine. It is substantially built. Population of the village, 1107.

Crieff is a burgh of barony, situated near the N. bank of the Earn, 17 miles W. by S. from Perth. Hand-loom weaving is still carried on to some extent. Population of the town, 3585.

Culross is a royal burgh, on the N. shore of the Frith of Forth, about 6 miles N.W. from Clackmannan, in a detached part of the county. It belongs to the Stirling parliamentary district. Population of the burgh, 603.

Cupar-Angus is partly in Forfarshire. [FORFARSHIRE.]

Doune is a village about 4 miles W. from Dumblane. It has a market cross and a handsome church. Population of the village, 1559.

Dumblane, or *Dunblane*, is a market town 28 miles S.W. from Perth by the Scottish Central Railway. It consists of a street of old-fashioned houses, and the remains of an old cathedral. Population of the town, 1559.

Dunkeld is a burgh of barony, on the left bank of the Tay, 15 miles N.W. by N. from Perth. This town derives benefit from visitors, who are attracted to it by the beauty of its situation, and its convenience as the point of entrance upon the Highlands. There is a fine bridge of seven arches over the Tay. Population of the parish, 2718.

Kincardine is a thriving port on the Tay, about 4 miles S.W. from Dumblane. Population of the town, 2875.

Perth, the capital of the county, and a royal and parliamentary burgh, is 35 miles N.N.W. from Edinburgh, and 62½ N.E. from Glasgow by the Scottish Central Railway. It is a place of great antiquity. The town is situated on the south-eastern bank of the Tay, and is connected by a handsome bridge over that river with the Bridge-end of Kinnoul. The streets of Perth are for the most part straight, and conveniently laid out. The houses are substantial, and those in the modern parts of the town built of freestone. The principal public building is the church of St. John. The square tower is of ancient but unascertained date, and is possibly part of the original church erected on this site. There are

numerous other places of public worship. The town also contains a handsome building containing the county-hall, courts of justice, &c.; a city and county gaol erected a few years ago; the Central Bank of Scotland, of Grecian architecture, completed in 1848; a theatre; and other public buildings. About 9 miles from Perth is the new episcopal seminary named Trinity College, consisting of a handsome quadrangular group of buildings in the gothic collegiate style. The principal manufacture is that of cotton. The salmon fishery of the Tay is very valuable. The number of vessels registered at the port on Dec. 31, 1847, was 90. Perth returns one member to parliament. Population of the city, 19,293; of the parliamentary burgh, 20,167.

Scone, a small village 2 miles N. by W. from Perth, is now only remarkable for the magnificent mansion in the neighbourhood known as the 'Palace of Scone,' which was built at the commencement of the present century on the site of the old structure. Population of the parish, 1202.

Stanley, a small village 5 miles N.W. from Perth, owes its existence entirely to the extensive cotton mills in the neighbourhood. The place is thriving, and increasing in importance. Population of the parish, 1945.

History and Antiquities.—In the obscurity that hangs over the geography of ancient Caledonia, little that is certain can be advanced as to the earliest inhabitants of Perthshire. The eastern side was occupied by the Venicontes (Οὐενικόντιοι) of Ptolemæus.

This county was the scene of hostility in the sixth and seventh campaigns of Agricola (A.D. 83, 84). The attack made by the Caledonians on the camp of the ninth legion, in the sixth campaign, was probably at Dealgin Ross. Septimius Severus must have crossed Perthshire in his war against the Caledonians (A.D. 206, 207).

At the downfall of the Roman Empire, Perthshire was occupied by the Picts, who had Abernethy for their capital: it afterwards came into the hands of the Scots. In the latter part of the 10th century, the Danes arrived at the mouth of the Esk with a large fleet, and landing, marched to the Tay. They were entirely routed by the Scottish king, Kenneth III., at Loncarty near Perth, probably in A.D. 990. The importance of Perth, and its rank as capital of the kingdom, made this shire the scene of many contests. The city itself was repeatedly taken and retaken in the course of the struggles of the civil war of Charles I. and the rebellions of 1715 and 1745.

The antiquities of the county consist chiefly of the remains of Dunblane and Dunkeld cathedrals; some other scanty ecclesiastical remains; some ruins of ancient castles at Moulin, Doune, Kincardine, Kinclaven, and Drummond Castle near Muthill; and some hill forts, cairns, and Druidical stones. Blair-Athol Castle has been modernised, and is the seat of the Duke of Athol.

PE'RTINAX, PU'BLIUS HE'LVIUS, born about A.D. 126, at Villa Martis, near Alba Pompeia, now Alba in Piedmont, was the son of a freedman who dealt in charcoal. His father gave him a good education. Pertinax became a proficient in the Greek and Roman languages; and after the death of his master, he taught grammar himself. He afterwards entered the army, and he served in Syria against the Parthians, in Britain, in Germany, and in Dacia. Under Marcus Aurelius he obtained the rank of senator, and he was sent into Rhætia and Noricum to drive away the hostile German tribes. He was then made Consul, and was employed by Marcus Aurelius as long as he lived. When the emperor died, Pertinax was governor of Syria, in which province he is accused of having enriched himself. On his return to Rome he was sent into a kind of banishment to his native country, where he remained three years; after which he was sent into Britain by Commodus to restore order among the mutinous soldiers. On his return from Britain he was sent as proconsul to Africa, and afterwards made prefect of Rome. After the murder of Commodus, Pertinax was declared emperor on the night before the 1st of January, A.D. 193. Pertinax recalled those who had been exiled for treason under Commodus, but his attempts to restore discipline to the army alienated the affections of the soldiers, who had been accustomed to license under the reign of Commodus. The intentions of Pertinax were honourable and just, and he was beloved by the senate and the people; but the turbulent prætorian soldiers rose against him, and murdered him in his palace. The emperor's head was cut off, and carried to the camp by the soldiers, who then offered the empire to him who would give them most. Pertinax was sixty-seven years of age, and had a short reign of eighty-seven days.

PERU is a country in South America, situated between 3° 30′ and 21° 28′ S. lat., and between 65° and 81° 20′ W. long. On the west it is washed by the Pacific; on the south and south-east it borders on Bolivia; on the east it is bounded by Brazil; and on the north by Ecuador. The length is 1150 miles; the breadth from 30 to 650 miles. The area is 500,000 square miles.

Coast and Harbours.—The coast-line is about 1500 miles in length. In an extent of 1200 miles this coast forms only three straight lines, which meet at obtuse angles, and are not interrupted by any large bays. The chief roadsteads and harbours along the coast are Arica, Islay, Arequipa, Acari, San Juan, San Nicolas, the Bay of Independencia, with its islands of Santa Rosa and Santa Vieja; Lambayeque, the Bay of Pisco, the Bay of Callao, and those of Salinas, Sapé, Guanme, Casma, Samanco, Ferrol, and Santa. The coast is too straight to admit of many of those large and deep harbours which are found in many other parts of America; while the absence of large rivers prevents the formation of æstuary havens.

The coast line is mostly rocky in the southern part; but it displays more low beach farther north. Between the roadstead of Lambayeque and the Bay of Guayaquil, a huge promontory runs out into the sea. At its base, between Lambayeque and Point Malpelo (3° 30′ S. lat.) it is 220 miles wide, and its coast-line exceeds 300 miles; it furnishes the two open bays of Sechura and Payta. As the heavy surf

occasioned by the swell of the Pacific renders landing with boats always dangerous, and often impracticable, *balsas* or log-rafts are used along this coast.

Surface, Soil, and Productions.—As Peru comprehends the whole of the mountain masses of the Andes which lie between 15° and 5° S. lat., together with the countries on both declivities of the chain, it is naturally divided into three different regions. The country between the chain and the Pacific is called *Las Valles*, and that included between the higher ranges of the Andes, *La Montaña*. The region on the eastern declivity of the Andes and the plains contiguous to it may be called the *Eastern Region*.

I. The country between the steep ascent of the Andes and the Pacific varies in width from 15 to 50 miles, and may be considered as the western base of the mountains. It has a great elevation above the level of the sea, where it lies contiguous to the range, on an average between 8000 and 10,000 feet, and from this elevation it slopes towards the sea with a very irregular surface. This irregularly inclined plain is furrowed by a number of depressions running from the Andes to the sea with a rapid slope, traversed by rivers, many of which are dry during nine months in the year, and only a few preserve a running stream all the year round. As it never rains in the lower portion of this region, vegetation and agriculture do not extend beyond the reach of irrigation. The narrow strips along the rivers are cultivated in proportion to the supply of water; while the uplands between the valleys are little better than sandy deserts. Though no rain falls along this coast, copious dews are deposited. The temperature is modified by the vicinity of the sea, and is seldom excessively high. The alternation of land and sea breezes renders the climate salubrious. Indian corn, rice, wheat, barley, potatoes, mandioc, yams, bananas, sugar, olives, and many kinds of fruit are reared, the different elevations of the valleys presenting sufficient diversities of climate. The soil is not very fertile, but requires a good deal of guano and similar animal deposits to manure it.

II. The *Mountain Region*, or *Montaña*, runs parallel to the Pacific, and from 20 to 50 miles from the shores. It comprehends the central portion of the Andes, consisting of two parallel ranges, extending from about S.S.E. to N.N.W. The western range is a continuous chain, without any break, and generally rises to 14,000 or 15,000 feet above the sea level. Among its summits are those of Nevado de Chuquibamba (22,000 feet), Arequipa (volcanic, 17,200 feet), and La Viuda (15,968 feet). The eastern chain runs, for the most part, parallel to the western, at the distance of about 100 miles. It is composed of an almost uninterrupted series of snowy peaks, which terminate with the Nevado of Salcantahi (13° 10′ S. lat.). The two chains unite at the elevated table-land of Pasco, which is situated between 11° 10′ and 10° 30′ S. lat. In the northern portion of the eastern chain there are a few snowy peaks, as the Paramo de Caracalla (near 7° S. lat.), and the Paramo de Piscoyana (south of 5° S. lat.).

The country included by these two ranges contains four regions, which differ materially in climate and productions. The *Table-land of Cuzco* is about 150 miles long by 100 wide; it is so elevated that the town of Cuzco, in 13° 31′ S. lat., is 11,380 feet above the sea level. The soil is moderately fertile, and is watered by many short but rapid rivers. The *Vale of the Rio Jauja* extends from the table-land of Pasco on the north, about 100 miles southwards, between both ranges of the Andes, and in the widest part may be about thirty miles across. It is less elevated than the table-land, and is more fertile and populous. The *Table-land of Pasco* cannot be exactly defined as to its length; but the width is about 60 miles, and in these parts it is inclosed by ranges which rise from 500 to 1000 feet above it. It is the highest of the table-lands inclosed within the Andes, the level parts being 14,000 feet above the sea-level. The great elevation gives it so cold a climate that nothing is cultivated; the mineral deposits are the only sources of its wealth. The *Vale of the Rio Marañon* extends from 10° to 5° S. lat. The southern part is very narrow, the river running in a valley so contracted, that it is merely a wide ravine. This valley is by far the hottest portion of the mountain region, and the vegetation in the lower parts does not differ from that of other tropical countries.

On the west side of the Peruvian Andes, the vegetable productions observe a gradation in character according to the elevation. There are several passes or mountain roads across the mountains, at elevations varying from 12,000 to 16,000 feet above the sea level.

III. The *Eastern Region* comprehends the eastern declivity of the Andes and the adjacent plains, as far as they belong to Peru. It is the least known portion of that country. The chief features in it are the Vale of the Rio Huallaga, 350 miles in length, and 9000 feet above the sea-level; the Pampa del Sacramento, a portion of the alluvial plain of the Amazon; and a rugged and thinly-populated region extending from the Rio Ucayali to the Rio Yavari.

Rivers.—The rivers which descend from the western declivity of the Western Andes and fall into the Pacific are shallow, have a short course, and flow with great rapidity. They cannot be navigated even by the smallest canoes, but the water is used to irrigate the adjacent flat tracts.

All the large rivers of Peru originate within the mountain-region, and all the waters which collect in it are united in three large rivers, the Tunguragua, or Upper Marañon, the Huallaga, and the Ucayali. These three rivers may be considered as the principal branches of the Rio Amazonas. The Upper Marañon, which is commonly considered as the principal branch of the Amazonas, issues from the lake of Lauricocha, on the table-land of Pasco. It is joined by the Huallaga near 5° S. lat. and 76° W. long., and afterwards by the Ucayali, which brings to the Amazonas the drainage of the mountain region situated between 11° and 15° S. lat. This large river is formed by the junction of the rivers Urubamba and Tambo, which takes place near 9° S. lat. [Amazon.]

Productions.—The trees and plants which are objects of cultivation have been already enumerated. The forests supply, besides timber, vanilla, sarsaparilla, copaiva, caoutchouc, dye-woods, medicinal barks, resins and gums, indigo, and a number of other useful products.

Domestic animals are not numerous; they comprise horses, mules, llamas, cattle, and a few sheep. Nearly all the wild animals peculiar to South America are found in Peru. Whales, seals, and fish are abundant along the coast or in the rivers.

Peru is noted for its wealth in silver and gold. The number of mines which have been worked is above a thousand; but most of them are exhausted, or at least abandoned. Among those which are still worked, the mines of Pasco are the richest. Quicksilver, copper, iron, lead, sulphur, saltpetre, and salt, are among the mineral products.

Inhabitants.—The inhabitants were estimated in 1845 at—Whites, 230,819; Peruvians, 848,846; Mestizoes, 323,732; Mulattos, 64,878; Slaves, 31,628; total, 1,499,953. The Peruvian Indians inhabit las Valles and la Montaña, to the exclusion of all other native tribes. They speak a language which is generally called the language of the Incas. They attained a considerable degree of civilization, and constructed many extensive buildings, of which vestiges yet remain. They are in the present day generally an industrious race. The native tribes which inhabit the vale of the river Huallaga have been converted, and are nearly equal in civilization to the Peruvians. The independent native tribes inhabit the low and level country east of the mountain region. Some of the tribes (which are very numerous) have been partially converted to Christianity, as the Conibos, Setebos, and Shipebos, but the missionaries have made no impression on the other tribes, and no attempt at conversion has been made among some of them; they exhibit generally a low state of civilization.

Political Divisions and Towns.—Peru is divided into eight departments, Truxillo, Junin, Lima, Huancabelica, Ayacucho, Cuzco, Arequipa, and Puno. The countries inhabited by the independent tribes are not comprised in these departments.

1. *Truxillo* extends over the northern districts of the republic. It contains numerous remains of ancient buildings. Payta is a commercial town with an excellent harbour; it is built on the slope and at the foot of a hill, and contains 5000 inhabitants. It is the port of the fine vale of the Rio Piura. The town of San Miguel de Piura, built on the banks of the river, about 20 miles from Payta, contains a population of from 8000 to 9000, and some manufactures of soap and leather. Lambayeque contains about 4000 inhabitants, and exports bullion and rice. Truxillo is situated in the middle of the extensive valley of Chimu, about two miles from the sea. The streets are wide and regular, and it has a fine cathedral and a handsome town-hall. The principal articles of export are bullion, sugar, and rice. Population, 9000. The valley of Chimu contains the ruins of a large Indian tower. In the vale of the Marañon are the towns of Caxamarca (7000 inh.) and Chachapoyas (3000 inh.). In the vale of the Rio Huallaga are the towns of Moyobamba (5000 inh.) and Tarapoto (4000 inh.).

2. *Junin* occupies the valleys along the Pacific which lie between Santa and Barranca. There are several ruins of ancient buildings, but they are not considerable. None of the towns situated in las Valles are important in a commercial view. The chief among them are Huambacho, Nepeña, Guarme, Barranca, Supé, Huari (7000 inh.), Caxatambo, Pasco (16,000 inh.), Huanaco (9000 inh.), and Tarma (6000 inh.). Pasco is built on the table-land of Pasco, 14,278 feet above the sea-level. It is probably the most elevated place in America, if not in the world, which is permanently inhabited. The site on which it stands abounds in silver ore, and the mouths of the mines are frequently in the middle of the streets.

3. *Lima* extends along the coast from Barranca (11° S. lat.) to Point Penates (15° 30′), and extends inland to the lower declivity of the Western Andes. North of Lima is the town of Huacho, built in an extensive and fertile valley. Lima, the capital of the republic, is about 6 miles from Callao. [LIMA; CALLAO.] The other towns are Chorillos, Cerro Azul, Pisco (3000 inh.), Yca, Nasca, and the ancient town of Pachacamac, now in ruins.

4. *Huancabelica* lies east of Lima, and extends over the Western Andes and the lower vale of the Jauja. The towns are Huancabelica (5000 inh.), Castro Vireyna, and Jauja (3000 inh.).

5. *Ayacucho* extends over a part of the Western Andes, the western lower portion of the table-land of Cuzco, and the valley of the Rio Mantaro. The capital is Huamango, a large place with 26,000 inhabitants; it contains several large private buildings of stone, covered with tiles; and has a fine cathedral and a university. Huanta is a small town, in a district which produces much wheat and Indian corn.

6. *Cuzco* extends over the greater part of the table-land of Cuzco. Besides the capital [Cuzco], there is no town of importance in this department.

7. *Arequipa* extends along the coast of the Pacific from Point Penates (15° 30′ S. lat.), to Point Sama (18° S. lat.), and inland to the declivity of the Western Andes. Besides the chief town [AREQUIPA], there are the towns of Acari, Ylo, and Islay (1500 inh.), the harbour of Arequipa.

8. *Puno* extends along the southern boundary of Peru. Besides the chief town [ARICA] there are Tacna (7000 inh.), Yquique (1000 inh.), Puno (9000 inh.), and Chuquito (5000 inh.).

In the countries of the independent tribes there were formerly several *missiones*, or stations of missionaries, who collected a number of aborigines and tried to convert them to Christianity. Nearly all these missions have been destroyed by the political changes to which Peru has been subject.

Manufactures and Commerce.—The Peruvian Indians consume a very small quantity of European manufactured articles. Only the creoles dress in European stuffs. There are some manufactures of cordovan leather, and some tanneries

and soap-houses. The iron utensils, such as hatchets, scissars, &c., made in Caxamarca, are highly valued. In the large towns many persons are occupied with making vessels, utensils, and ornaments of gold and silver.

The country is too mountainous to admit the making of carriage-roads in the interior. Mules and llamas are generally used by travellers and for the transport of merchandise. Six great roads traverse the country from west to east; and the goods imported from foreign countries are sent by these roads into the interior of Peru. The goods exported are chiefly gold, sugar, and saltpetre. The principal harbours from which the exports are made, are—Payta, Lambayeque, Callao, Pisco, Islay, Arica, and Yquique. The British goods landed in Peru in 1846 were valued at 820,535*l*.

History.—When the Spaniards first visited Peru, they found the country under a well-regulated government, and inhabited by a nation which had made great progress in the arts of civilization. Pizarro landed at Tumbez in 1526, and completed the conquest of Peru in 1534. He built the towns of Piura, Truxillo, Lima, Arequipa, and Huamanga. The disorders which immediately followed the conquest nearly caused the loss of the country, a circumstance which determined the court of Spain to make Peru the chief seat of the Spanish dominions in South America. Lima was chosen for the capital, and it soon rose to such opulence that it was called the City of the Kings. The authority of Spain took deeper root in Peru than in any other of her South-American colonies, and remained for three centuries nearly undisputed.

When the Spanish colonies began to rise against the mother country, after the year 1810, Peru remained quiet; and though some of the neighbouring provinces had already expelled the Spanish armies, and others were attempting to do the same, the Spaniards remained in undisturbed possession of Peru until 1820. The contest between the Republicans and Spain lasted from 1820 till 1824, when the battle of Ayacucho put an end to Spanish dominion in Peru. From that time to the present Peru has been torn by internal convulsions between rival claimants to the Presidentship or Dictatorship of the Republic. [Bolivar.] The constitution of the Republic is based on that of the United States.

PERU'GIA, DELEGAZIO'NE DI, a province of the Papal State, is bounded on the N. by Pesaro e Urbino, on the W. by Tuscany, on the S. by Spoleto and Viterbo, and on the E. by Macerata and Spoleto. Its length is about 60 miles, breadth 20 to 35, and area 1790 square miles. The province of Perugia is entirely in the basin of the Tiber. The Lake of Perugia (Lacus Thrasimenus) lies within the province, near the borders of Tuscany; its circumference is about 30 miles, the greatest width is about 8 miles, but the depth is not more than 30 feet. It contains three small islands. A tunnel has been formed to carry off the waters of the lake to the river Caïna. The province is chiefly hilly, being crossed by offsets from the Apennine chain, which stretch southwards in a direction parallel to the course of the Tiber. The principal affluents of the Tiber in the province of Perugia are—the Chiascio, Topino, Nestore, Caïna, Naja, Chiana, Astrone, Tresa, and Paglia; they are all small.

The province of Perugia is the most fertile of the provinces of the Papal State south of the Apennines.

The following are the principal towns of the province:—1, Perugia. 2, Assisi. 3, Nocera. 4, *Foligno* has a handsome cathedral, several other fine churches, and manufactures of woollens, silks, extensive paper mills, a considerable inland trade, and 7300 inhabitants. 5, *Todi* has a cathedral and another handsome church, with several remains of Etruscan and Roman antiquities, among which are the town walls and the ruins of a temple of Mars. The population is 2500. 6, *Città di Castello*, a well-built town, with 5000 inhabitants, contains several fine churches, some good paintings, and the palace of the former baronial family of Vitelli. 7, *Città della Pieve*, a small town situated on an eminence above the Chiana, has about 2000 inhabitants. 8, *Marsciano*, a walled town in the valley of the Nestore, has about 2000 inhabitants, and a fertile territory. 9, *Fratta*, on the eastern bank of the Tiber, has some good buildings, a theatre, and a bridge on the river; the population, including its territory, is 4700. The inhabitants manufacture pottery, which they paint with considerable taste. 10, *Castiglione del Lago* has some good buildings, and about 5300 inhabitants, including the territory of the commune. 11, *Gualdo*, at the foot of the Apennines, has about 4000 inhabitants. 12, *Spello* is on the site of the ancient Hispellum, of which there are still considerable remains. Spello has several churches, with good paintings, a college, and about 2400 inhabitants.

The province of Perugia is divided, for administrative purposes into four districts, Perugia, Città di Castello, Foligno, and Todi, containing altogether 210,316 inhabitants.

PERUGIA, the chief town of the province of Perugia, is built on a high hill on the western bank of the Tiber. It is surrounded by walls in the form of a polygon. The streets are wide, and the squares are lined by massive old buildings. It has also numerous churches with lofty domes. Perugia is a bishop's see, and it has a long-established university, which posseses a fine library, a botanical garden, a collection of minerals, and a cabinet of antiquities rich in Etruscan inscriptions, bronzes, vases, and medals. There are also an academy of the fine arts, several private galleries of paintings, two theatres, and a casino, or assembly-rooms of the nobility.

The population is about 15,000. The circumference of the wall is above six miles, but much of the area within is open and unbuilt upon. The citadel occupies a considerable space. Perugia has some manufactories of silks, woollens, and soap; but the principal trade consists in the products of its fertile territory, corn, oil, wool, and cattle. The finest buildings are the Duomo, or cathedral, the church of San Francisco, the church of San Domenico, the vast Benedictine convent of San Pietro, the town-house, the old exchange, and

several palaces. The churches are nearly 100 in number, and most of them have fine paintings.

Perusia was one of the chief cities of ancient Etruria, and acted a principal part in the wars of the Etruscans against Rome. In the second Punic war, Perusia was one of the allied towns that sent timber and provisions to Scipio to fit out his armament against Africa. At the fall of the Western Empire it was devastated by the Goths under Totila. It passed afterwards through the same vicissitudes as most other towns of Italy: it ruled itself for a time as a free municipality, had its factions of Guelphs and Ghibelines, its own rulers, and at last submitted voluntarily to the government of Braccio da Montone. It was united to the Papal State by Pope Paul III.

PERUGI'NO, PIETRO, or PIETRO VANNUCCI, was born in 1446 at Castello della Pieve. His father placed him as a shop-boy with a painter of Perugia. When about 25 years of age he visited Florence, and, according to Vasari, became a pupil of Andrea Verocchio, the master of Leonardo da Vinci; but the truth of this statement seems doubtful. In 1475 he was employed by the magistrates of Perugia, and in 1480 he executed some frescoes for Sixtus IV. in the Sistine chapel at Rome: only one or two of these now remain, the greater part having been destroyed to make room for the Last Judgment of M. Angelo. The Dead Christ, and other figures so much praised by Vasari, were painted for the nuns of Santa Chiara at Florence in 1485. In 1500 Pietro executed the frescoes in the Cambio at Perugia. He afterwards visited Florence again, but, in consequence of a quarrel with the artists there, he returned to Castello della Pieve, where he died in 1524.

Vasari says 'he gave all his figures one and the same air;' it must however be admitted that this air is far superior to the contortions of Vasari himself and his fellow-pupils in the school of M. Angelo. His style is hard, but he has great technical skill, especially in colouring. Raphael was a pupil of Perugino, and his early works, such as the Marriage of the Virgin, greatly resemble those of his master.

PERUVIAN BARK. [CINCHONA.]

PERUZZI, BALDASSA'RE, was born in 1481, at Volterra. He studied painting at Siena, and afterwards went to Rome, where he painted some frescoes in the church of San Onofrio, and in that of San Rocco à Ripa, and distinguished himself by some others at Ostia, particularly by one in chiaro-scuro, representing a siege by Roman warriors. In Rome he found a liberal patron in Agostino Chigi (a native of Siena), by whom he was enabled to devote himself chiefly to the study of architecture. The acquirements he thus made soon displayed themselves in what was then quite a new career of art, namely, architectural perspectives and scene-painting, and the science of perspective and its application to pictorial illusion and effect. Some idea of his extraordinary ability in perspective may still be formed from the painted architecture, &c., with which he decorated a gallery in the Farnesina. It was not however in scenic and fictitious architecture alone that he displayed his talent for that art; he designed many elegant façades at Rome, and gave proof of his superior ability in the Palazzo Massimi, one of the most original and tasteful edifices of its class in that city, which however he did not live to see quite completed. He died in 1536, not without suspicion of having been poisoned by a rival who sought to obtain the appointment which he held as architect of St. Peter's.

PE'SARO E URBI'NO, LEGAZIONE DI, a province of the Papal State, is bounded on the east by Ancona, on the north and north-east by the Adriatic Sea, on the west by Forli and Tuscany, and on the south by Perugia. The area is estimated at 1749 square miles. Many offshoots from the Apennines traverse the province. The principal rivers are the Conca, Foglia, Metauro, Cantiano, Candigliano, Césano, and Misa. The surface is hilly; some parts of it are very fertile, but the mountains are generally barren. The province is divided into five districts—Urbino, Pesaro, Fano, Sinigaglia, and Gubbio, containing altogether 237,966 inhabitants. The following are the principal towns:—URBINO, which is the old capital of the province, and the residence of the former dukes. *Pésaro*, a well-built town and a bishop's see, has several fine churches with some good paintings, a fine market-place, several palaces of the nobility, the palace of the former dukes, a public library of 15,000 volumes, with a museum and a cabinet of models. Pesaro has a small harbour, several manufactories of silks, pottery, glass, and leather, and about 11000 inhabitants. *Fano* is a town with about 7000 inhabitants. It has a triumphal arch dedicated to Augustus, several churches with paintings by Guido and Guercino, a handsome theatre, some silk manufactories, and a public library. *Sinigaglia* is a bustling town with a small harbour, several churches and convents, and about 8000 inhabitants. It is chiefly remarkable on account of its great fair, one of the largest in Italy. *Fossombrone* is a bishop's see, has several churches and convents, a bridge over the Metaurus, and about 4000 inhabitants. The silk spun at Fossombrone is considered the best in Italy. *Gubbio* has several churches and other buildings worthy of notice, and about 4500 inhabitants; there are many remains of antiquity in the neighbourhood. *Cagli* has about 3000 inhabitants, and some remains of antiquity. *Urbania* has a collegiate church and about 4400 inhabitants.

PESCIA. [FLORENCE.]

PESHAWER. [AFGHANISTAN.]

PESNE, JEAN, a painter and engraver, distinguished chiefly for his excellent prints after N. Poussin. He was born at Rouen in 1623, and died at Paris in 1700. The chief merit of his prints after Poussin is the preservation of the peculiar style of that painter: they are generally of a large size, and are valued by collectors. He engraved also many prints, chiefly landscapes, after Annibal Carracci.

PESTH, the most populous city in Hungary, is situated 132 miles E. by S. from Vienna, in 47° 30′ N. lat., 19° 4′ E. long., on the left bank of the Danube, which is here about 1500 feet broad, and

connected by a bridge of boats, 3800 feet in length, with the city of Buda, or Ofen, on the right bank of the river. [Buda.] The boats that form the bridge are removed in the beginning of December, as about that time the river is passable on the ice. In order however to maintain an uninterrupted communication between the two banks, a chain bridge has been constructed under the superintendence of an English engineer. The city of Pesth is about seven miles in circumference. It consists of five principal parts—1, the old town, which, though antiquated and irregularly built, contains some fine buildings; 2, the Leopoldstadt; 3, the Theresienstadt; 4, the Josephstadt; and 5, the Franzstadt—so named after the sovereigns in whose reigns they were built. Leopoldstadt is now joined to the old town, the walls which formerly surrounded the latter having been levelled to make room for new buildings. Leopoldstadt is built on a very regular plan. The other three parts or suburbs are separated from these two by a very broad street. Among the twelve Catholic churches, that of the university is distinguished by its fine steeple and excellent fresco paintings. The Greek church is one of the finest buildings in the city, but the Calvinist churches are very plain edifices. Of the other public buildings, the following deserve notice: the great barracks built by Charles VI.; the hospital of invalids, which serves as barracks for a regiment of artillery; the theatre, a very handsome edifice, capable of containing 3000 spectators; the national museum, and the university, which was founded in 1635 at Tyrnau, transferred by Maria Theresa in 1777 to Ofen, and in 1784 by Joseph II. to Pesth. The university has a library of 60,000 volumes, a cabinet of natural history, a collection of medals, a chemical laboratory, and an anatomical and pathological collection. Dependent on it are the botanic garden, the veterinary school, the university hospital, and the observatory at Ofen. [Buda.] The National Museum, which is independent of the university, contains a fine library and a valuable collection of coins and medals, numbering about 60,000 specimens, of which the Greek, Roman, and other antique silver medals, exceed 12,000. The gymnasium of the Piarists has 800 scholars; and the city normal school (likewise in the convent of the Piarists), above 400. The manufactures are silk, cotton, leather, jewellery, and musical instruments; that of tobacco is a government monopoly. Pesth has, next to Vienna, the greatest trade of any city on the Danube. It has four fairs, each of which lasts a fortnight. The principal articles sold are manufactures, colonial produce, cattle, wine, wool, tobacco, and raw hides, honey, wax, &c. The environs of Pesth are not picturesque, the city being situated on a sandy plain, but there are some fine promenades. The population, including a garrison of 10,000 men, amounts to about 75,000. Pesth has been frequently laid waste by war, and was in the possession of the Turks for nearly 160 years, who were not finally expelled till 1686. At the beginning of the 18th century it was one of the most inconsiderable towns in Hungary. Its improvement may be dated from the reign of Maria Theresa, and has since been progressive and rapid. The winter of 1838 was disastrous to Pesth, above 1200 houses being destroyed by the overflowing of the Danube; but a few years efficed all traces of this devastation. Such was not long ago the state of Pesth; but on the 28th of September, 1848, the bitter hostility of the Hungarians to Austria was shown by the murder of the Imperial Commissioner, Count Lamberg, on the bridge of Buda-Pesth. Active insurrection followed; the town has been taken and retaken by Austrian and Magyar; and both Pesth and Ofen now bear many marks of the sad injuries caused by civil war. The royal palace which crowned the heights of Ofen, and in which the Palatine used to hold his court; the Vienna gate; the bastions and parapets of the fortress, were reduced to heaps of ruins by the bombardment of Görgey; and the Redouten-Saal of Pesth, in which the Hungarian convention met, and many others of its public buildings, have been destroyed or greatly injured by the cannon of Windischgrätz. (J. v. Thiele, *Das Königreich Ungarn*, vol. vi.; *Oesterreichische National Encyclopädie*; Blumenbach, *Gemälde der Oesterreichischen Monarchie*.)

PESTILENCE, or PLAGUE, is a disease of so fatal and malignant a nature, that to this very circumstance it probably owes its nomenclature. The nosological definition of this disease by Dr. Cullen is perhaps as correct as can be given in few words:—'A typhus fever, in the highest degree contagious, and accompanied with extreme debility. On an uncertain day of the disease, there is an eruption of buboes or carbuncles.' Dr. Patrick Russell, who practised at Aleppo during the plague of 1760-1-2, informs us that its progress at its commencement is much the same in the several parts of the Levant as in the cities of Europe. It advances slowly, fluctuating perhaps for two or three weeks; and although at that period it generally proves fatal, yet it is often unattended by its characteristic eruptions. Indeed the cases in which the eruption is wanting constitute the most rapidly fatal type of the disease. The general derangement of the system which ushers in an attack of the plague, is much like that which commences the course of ordinary fever. A sense of cold, with some shivering, which is soon followed by heat and acceleration of the pulse, with giddiness, headache, depression of strength and spirits, white tongue, vomiting or diarrhœa, and great oppression about the præcordia, are among the first symptoms of the disease. These are succeeded by a burning pain about the pit of the stomach; by a peculiar muddiness of the eyes; by coma, delirium, and other affections of the sensorium, which terminate by death in some cases on the second or third day, before the pathognomic symptoms, buboes and carbuncles, have appeared. In other cases these last-mentioned symptoms are present, together with purple spots and ecchymoses, which belong to the plague in common with other malignant fevers. Though these are the ordinary symptoms of plague, they are not all invariably observed in

the same individual; but many varieties occur, which chiefly have reference to the greater or less virulence of the disease, and the absence or presence of some particular symptoms. No age, sex, or profession appears to enjoy an immunity from plague, nor does one attack secure the individual from future infection. Like many other diseases, plague is observed in two forms: first, as an indigenous and local disease, peculiar to the inhabitants of certain countries, and from which they are never entirely free; and secondly, as a raging and fatal epidemic, not confined to its original seat, although exhibiting itself there in its most intense forms.

With respect to the progress and termination of plague, the disease appears to be subject to the same laws as regulate the course and termination of other epidemics: it is most fatal at its first outbreak, and becomes less virulent as it increases in extent.

The causes of all pestilential diseases have been referred by some to a vitiated atmosphere, engendered by epidemic and endemic causes, and wholly independent of contagion; while others have attributed it solely to the latter influence. If the facts however of epidemic diseases be investigated it will be found that three conditions are necessary to their spread:—1st, a peculiar poison, as in plague, small-pox, scarlatina, &c.; 2nd, a state of the atmosphere favourable to the spread of this poison; and 3rdly, a predisposition to take the disease on the part of those who suffer. In earlier times it was customary to regard plague as alone propagated by contagion, and from this has arisen the establishment of quarantine laws. It has however been found that where the atmospheric conditions were favourable, and the people predisposed, that no quarantine has been effectual to the keeping away this formidable disease. On the other hand where sanitary arrangements are carefully attended to, so as to secure the health of the inhabitants of particular localities, there plague and other contagious diseases are comparatively inert. It is on this latter ground that it has been proposed to abolish quarantine regulations altogether. Although in the present defective sanitary condition of most cities and towns of the habitable globe, this would be a hazardous practice, yet there can be no doubt that the present quarantine laws of all nations are absurdly severe, and demand extensive alterations to adapt them to the present increased knowledge of the causes of epidemic disease. From the length of time that has elapsed since plague was known in Great Britain, it is to be hoped that the atmospheric and individual conditions for its spread have been for ever got rid of.

Treatment of Plague.—The preventive treatment of plague will be gathered from what we have said respecting the causes of this disease, and the most effectual barriers that can be opposed to its future introduction into Europe, are, to adopt the language of Dr. Hancock, 'the barrier of cleanliness in our towns and villages against filth and crowded habitations; the barrier of Christian charity towards our poor against famine and distress; the barrier of peace against the desolating evils of war; and the barrier of industry against the vice of sloth.' With regard to remedial measures, it appears little can be done towards arresting the progress of plague after it has once declared itself in an individual. Our efforts therefore are limited to removing the patient from those sources of miasm which gave origin to his disease, and in placing him in those conditions which are most favourable for his recovery. Free exposure to fresh air, supporting the strength, and regulating the secretions, are the only means which promise much chance of success. When this plan is adopted, we have the authority of our latest writers on this subject for declaring that the mortality of the disease may be considerably diminished. Thirty per cent. only of those attacked die under this mode of treatment; while in the lazaretto at Alexandria, 90 per cent. died in 1833, and 77 in 1836. With respect to the management of buboes and carbuncles, they must be treated in the way which is found efficacious in their removal when uncomplicated with plague, and if by these means we are unable to effect their dispersion, suppuration may be promoted by the employment of emollient cataplasms or any other mild stimulant.

Pestilential, Epidemic, or *Asiatic Cholera* is a disease hardly less fatal than that which we have just described; and in its endemic origin, its occasional epidemic eruptions, its selection of victims, and the localities which it ravages, it bears a striking resemblance to plague. Its essential character is however perfectly distinct, as will be seen by the following account of the symptoms of cholera. The disease has two well-marked stages: the cold or choleric, called also the stage of collapse; and the hot or febrile stage, or that in which reaction takes place. The first is generally preceded by certain premonitory symptoms, among the most prominent of which is diarrhœa, accompanied usually with languor and some degree of nausea; the dejections are fæcal and bilious, and often very copious. The commencement of the purging may precede the accession of the stage of collapse for several days, or only a few hours may elapse. It is important not to think lightly of this stage of the disorder during the prevalence of epidemic cholera, for many a life might have been preserved if timely warning had been taken, and appropriate treatment adopted for removing it, before the accession of the symptoms about to be described.

Symptoms of the Cold Stage.—The time of its invasion is, in the majority of instances, from two to four o'clock in the morning. The patient is attacked with uneasiness of the stomach, to which speedily succeed vomiting and purging of a watery, colourless, and inodorous fluid, similar to barley-water, or more frequently to rice-water: sometimes it is like milk, and occasionally yellowish; but the 'conjee-stools,' as they are termed, which consist of albuminous flakes floating in serum, or discharges of pure serum, are of the most frequent occurrence. These discharges are attended with severe cramps in the extremities, especially in the calves of the legs, and are succeeded by exhaustion, giddiness, and sinking of

the pulse; the pulse is small, weak, and accelerated; and after a certain interval becomes imperceptible. The skin is cold from the commencement; and as the disease advances, it becomes gradually colder, and is covered either with a profuse sweat or a clammy moisture. The features are shrunk and anxious: there is restlessness and agitation, with great thirst, heartburn, and hurried respiration. Notwithstanding the coldness of the body externally, the patient complains of heat, and throws off his bed-clothes. As the cold increases, the skin frequently becomes blue; the eyes, which are dull and suffused, seem drawn into and fixed at the bottom of their sockets; the tongue is cold, but moist; the voice is feeble, hollow, hoarse, and interrupted; but the mental functions remain undisturbed to the last. At this advanced period the collapse is complete, the respiration very slow, and the patient, who suffers little or no pain, presents the appearance of a person who has been dead for some time. The urine is usually suppressed throughout the whole of this stage; but the dejections, becoming thinner and thinner, continue to the last. Some patients, although blue, cold, and pulseless, have sufficient strength to go about; many however die of exhaustion before all these symptoms have declared themselves. In the majority of cases the spasmodic symptoms are first observed, and afterwards the collapse: the former are characterised by pain, evacuations, and moans; the second, by the suppression of voice, urine, and heat. If however the patient get over the cold state, that of reaction commences. The coldness and blueness gradually disappear; the pulse returns, increasing in force and frequency; to the pale or blue cheek succeeds the flush; the eye brightens; the tongue, which was of a dirty white, becomes cleaner and dry; vomitings are less frequent, but diarrhœa continues; and there is some tenderness of the abdomen, with thirst, great disgust of food, and intense headache. The urine however is secreted; and if all goes on well, at the end of two or three days the features assume their usual expression; the stools are less frequent and more natural; the strength and appetite begin to return; the pulse resumes its ordinary character; and the patient is convalescent. Several varieties occur in the duration and intensity of cholera. Soldiers attacked in full march have been known to retire from the ranks, lay down their arms by the road-side, and expire in two hours. During the prevalence of the epidemic in India, several instances have been recorded of natives being struck with the disease while walking in the open air; they fell down, retched a little, complained of vertigo, deafness, and blindness, and expired in a few minutes. This rapidly fatal form of cholera has not been observed in this country. The most severe cases generally last five or six hours; but the average duration of the fatal cases, when they did not terminate in consecutive fever, is from twelve to fourteen hours. When reaction has been established, and fever supervened, the duration of fatal cases is from four to ten days. As a general rule to guide us in forming a prognosis, it may be stated that the more complete is the collapse, the greater is the danger; and if the patient survive it, the more violent and malignant is the subsequent fever. The cases in which spasms and vomiting are most violent are by no means the most dangerous.

History of Cholera.—Although at one time it was supposed that cholera was a new disease, recent researches have brought to light so many accounts of epidemics, though not so severe as those of the present century, having the characters of cholera, that there can be little doubt of its having visited this country in the 16th, 17th, and 18th centuries, as well as the 19th century. Pestilential cholera in this century first commenced in India and traversed successively nearly every country in the world. It originated in the district of Nuddeah and in some other parts of the delta of the Ganges, about the end of May or the beginning of June, 1817. During that year it did not extend beyond the territory of Lower Bengal; but in 1818 and the early part of 1819 it diffused itself through the extreme length and breadth of the Indian peninsula, yet leaving untouched many districts placed between its line of movement. Its progress along the lines selected was wonderfully uniform, being, for some successive months, at the rate of about one degree in a month. As early as 1818, it extended itself beyond the boundaries of Hindustan into the Birmese Empire and other parts of Eastern Asia, and making gradual progress through these countries, reached China in 1820, and in the following year visited the numerous and populous islands of the Indian Archipelago. The Isle of France suffered its invasion in 1819, and some cases occurred in the same year at one point in Bourbon. In 1821 it extended along the shores of the Persian Gulf, and, during this and the following year, spread through parts of Arabia, Persia, and Syria, and closely threatened Europe. It appeared in the Russian territories in 1823, at Tefflis, Orenburg, and Astrakan; but its farther northern and western progress was stopped for a time. It however reappeared in Orenburg in 1828, and again in 1829, and in 1830 advanced through the southern provinces of the Russian Empire till it reached Moscow on the 28th of September of that year, and Petersburg the year following. Warsaw was attacked in March, 1831; Danzig in May; Berlin in August; Hamburg and Sunderland in October; and London and Paris in 1832. At the end of 1833 it had reached Mexico and several other parts of America. For several years after this the disease appeared to have subsided, only occasionally presenting itself in India. In 1843 it again became epidemic in India, and spread itself from east to west in almost the same direction as it had done on the previous occasion. In 1847 it had again reached the Russian dominions; in 1848 it attacked Paris and Glasgow, and in 1849 it again appeared in London and the English provinces generally. In many other points the history of these two epidemics are strikingly similar, more especially their fatality and the number of deaths in proportion to the population attacked. In England however there has been a difference which is strikingly in favour of the former epidemic. In 1832–3 the amount

of death in England was 14,807, whilst up to October 13, 1849, the deaths in London alone had been 14,497. Other towns in the kingdom seem to have suffered proportionably. This great increase of mortality is a serious reflection on the sanitary condition of our towns, and requires increased attention to be paid to the removal of the predisposing causes of the disease. The victims of cholera are those in the prime of life, and extensive statistical returns prove that the greatest mortality occurs between the ages of 20 and 40.

Causes of Cholera:—In the history of no disease has there been so much difference of opinion as to whether it is disseminated by a poison generated from the bodies of those affected by the disease, or from some poison existing externally to the human body. Much evidence has been advanced, sufficient to show that an exclusive view on either side would be wrong. There are undisputed facts to show that cholera can be conveyed in ships and by persons from one district to another, and that this is the usual way in which it has been carried from one country to another. At the same time many instances are recorded in which the disease has broken out without any traceable intercourse with infected persons and districts, and giving a ground for the belief that the poison has been locally generated. The absence of anything like demonstration with regard to the existence of a special poison like those of small-pox and scarlatina, or of the combination of circumstances that would produce the poison locally, have led some writers to suppose that cholera is due to the presence of a fungus in the air, such as is found to produce the attacks of smut, brand, and blight in wheat, &c. Bodies found in the matters passed from the stomach and bowels of cholera patients have been invested with the characters of fungi; but a further examination has proved them to be only the remains of the food taken into the system. The nature of the poison therefore producing the disease must still be looked on as doubtful. The atmospheric condition and predisposing states of the system are however better understood. It is in hot and damp states of the weather that cholera breaks out and spreads most rapidly. The most fatally predisposing causes of the disease are those states of the body which are produced by living under unhealthy circumstances. Breathing contaminated air, arising from bad ventilation or filth, is a powerful predisposing cause, and it has always been found that persons under such circumstances have been most fatally affected. Intemperance, exhaustion from any cause, physical or mental, and debility from disease, have also been found powerful predisposing causes.

Treatment.—It is most important to recollect the fact that the great proportion of fatal cases of cholera are ushered in by a diarrhœa, which, although essentially a stage of the disease, can yet be *easily* arrested by proper remedies. Of these the chief is opium, which in combination with astringents or calomel, according to circumstances, should be administered after every evacuation till the diarrhœa is arrested. In the stage of collapse, stimulants, such as ammonia, cajeput, &c., are indicated, and stimulating applications to the skin, as the warm bath, sinapisms, &c. Unfortunately the evidence with regard to remedies in this stage is conflicting; but the majority of practitioners, in addition to stimulants, give calomel, either in small doses frequently, or in large doses less often. In every case however the judgment of the practitioner will be taxed to administer the most appropriate remedies. When the stage of collapse is passed, that of fever is no less dangerous. It seems to arise from the condition of the organs having become injured during the collapse. Of the various parts of the body which thus become disordered there are none so frequently affected as the kidneys. Cupping over the loins, and calomel, are required in this case. Sometimes the lungs and sometimes the brain are congested, and these and all other complications, must be treated on the same general principles as though they had occurred idiopathically.

PETAL is one of the inner divisions of the organs clothing a flower, and called Floral Envelopes. These are usually double, the outer being a Calyx composed of Sepals, and the inner a Corolla composed of Petals. Both these parts are leaves incompletely organised. The Petal being fugitive, and of very temporary utility, is generally the more delicate, containing no woody tissue to protect the spiral vessels. It is sometimes of extraordinary size, but is as frequently a very minute body.

PETA'VIUS, DIONYSIUS PETAU, born at Orleans in 1583, studied at Paris, and afterwards entered the order of the Jesuits. He lectured on rhetoric in the colleges of Rheims, La Flèche, and lastly at Paris, in which he was made professor of theology in 1621. His great work on chronology, published in 1627, in 2 vols. fol., is entitled 'De Doctrinâ Temporum.' It was republished in 3 vols. folio, Antwerp, 1703. He died in the Jesuits' College of Clermont at Paris, in 1652.

PETE'CHIÆ are small spots of a dark red colour, produced by the effusion of drops of blood in the skin just beneath the cuticle. At first sight they look very like flea-bites, but they do not disappear when they are pressed with the finger. They usually indicate an altered state of the blood, and are often symptoms of very serious diseases, as in typhus fever (some varieties of which have hence been called petechial fever), scurvy, purpura, &c. They commonly appear also in very severe cases of small-pox, measles, and scarlet fever, and are amongst the worst symptoms by which those diseases are marked.

PETER, ST., one of the twelve Apostles, was born at Bethsaida, on the western side of the lake of Gennesareth. His name at first was Simon, which was changed by our Lord into Cephas, a Syriac word signifying a stone or rock; in Greek, *petra*, whence Peter. In conjunction with Andrew his brother, he followed the occupation of a fisherman. Both were hearers of John the Baptist, by whom they were taught that Jesus Christ was the Messiah. While plying their business on the sea of Galilee, the Saviour called them to be his disciples:—'Follow me, and I will make you fishers of men:' immediately they quitted their boats

and nets, and became his intimate friends and constant associates. The principal events of Peter's life are related in the New Testament. He is supposed to have suffered martyrdom at Rome in the year 65.

St. Peter was the author of two Epistles, both of which make part of the Scriptures. The first is addressed 'to the strangers scattered throughout Pontus, Galatia, Cappadocia, Asia, and Bithynia.' The date of this epistle may be fixed at about the year 64. The second Epistle was written soon after the first.

PETER OF BLOIS, better known by his Latinised name Petrus Blesensis, a writer of the 12th century. He spent much of his life in England, having been invited thither by Henry II., who gave him the archdeaconry of Bath, which he afterwards resigned for that of London. He died in England in 1200. The edition of his works by Pierre de Goussainville, folio, 1667, is accounted the best.

Peter visited Bologna for the purpose of acquiring a knowledge of Roman law, and his letters contain numerous indications of his acquaintance with this subject. A work of his on canon law and process has been discovered, of which an account is given in the 'Zeitschrift für Geschichtliche Rechtswissenschaft,' vol. vii., p. 207.

PETER THE CRUEL (*Pedro IV. of Castile*). [SPAIN.]

PETER I., called *Peter the Great*, Czar of Russia, was born at Moscow, June 11, 1672. His father, Alexis Michaelovitz, was twice married: by his first wife he had two sons and four daughters; and one son (the subject of this notice) and one daughter (Natalia Alexowna) by his second wife. He died in 1677, and was succeeded by his eldest son Theodore, a youth of delicate constitution, who died in 1682, leaving no issue. The next son Ivan was subject to epileptic fits, and of so weak intellect that Theodore named Peter as his successor. The princess Sophia, an ambitious woman, who had intended to reign herself, through the medium of her incompetent brother, being enraged at this appointment, engaged the strelitzes on her side, and fomented an insurrection, which was only appeased by Ivan being proclaimed joint sovereign with Peter, and Sophia as regent. When Peter was 17, his party brought about a marriage between him and the daughter of the boyar Feodar Abrahamavitz, during the absence of Prince Galitzin, who had been associated by the Princess Sophia with her in the government. On the pregnancy of the Czarina being declared, Galitzin, whose plans were entirely deranged by this event, raised an insurrection, which however was soon suppressed, and Galitzin was banished to Archangel, and his estates were confiscated. The Princess Sophia was confined in a convent for the rest of her life, which terminated in 1704.

From this time (1689) Peter reigned supreme; his brother Ivan never interfered, and died in 1696. Peter, who was now in the 18th year of his age, immediately commenced the vast undertaking of reforming the whole system of government and the manners of the people, in which he had to encounter the jealousies of every class of his subjects. He first directed his attention to the army, in which department his plans were ably seconded by Generals Le Fort and Patrick Gordon, who, with other foreigners, had entered into his service. He himself entered the army as a private soldier, and rose through all the intermediate ranks before he obtained a commission. He caused all the young boyars to follow this example. The sight of a small vessel built by some Dutchmen in his father's time, on the river which runs through Moscow, made a great impression on him, and he determined to have a navy. He hired Dutch and Venetian shipwrights, who built some small vessels at Pskov, in which he used to cruise on the Lake Peipus, until that becoming too confined a space for him, he went to Archangel, where he passed two summers cruising on board English and Dutch ships, and learning the duties of a practical seaman. Resolving to be no longer dependent on foreigners for his ships, he sent a number of young Russians to Venice, Leghorn, and Holland, to learn the art of ship-building. By these measures his expenditure had been so much increased that it was necessary to raise the custom-house duties from 5 to 10 per cent., which caused an increase of nearly 2,000,000 rubles in the first year. In 1696 he besieged and took Azof. During the rejoicings which followed this first victory by the army and navy of his own creation, some of the discontented boyars and strelitzes conspired to put him to death, but, being betrayed, the plot was defeated by their arrest and execution.

Peter, in order to make himself thoroughly acquainted with naval matters, went in 1697 to Holland, and thence in January, 1698, to England. In both countries he assumed the style and name of a common workman, was employed in the dockyards, and received wages like a common shipcarpenter. In April, 1698, he quitted England, taking with him several men of science, engineers, and officers for his army and navy. He shortly afterwards proceeded to Vienna to make himself acquainted with the dress, discipline, and tactics of the emperor's army, then considered the best in Europe. He was preparing to visit Italy, when he received news of a rebellion having broken out among the strelitzes, fomented, it was said, by the priests and the Princess Sophia. On his arrival at Moscow he found that the rebels had been defeated by General Gordon, whom he had left in that city with 4000 of his guards. The dark side of Peter's character now showed itself in the savage nature of the punishments inflicted on the rebels.

Peter afterwards proceeded to regulate the printing-press, and caused translations to be published of works on various useful subjects, established schools for the teaching of languages, obliged his subjects to trade with other countries, and altered the calendar, ordering that the year 1700 should commence on the 1st of January, instead of the 1st of September. He also instituted the order of St. Andrew, the patron saint of Russia.

In 1700 Peter entered into an offensive league

with Poland and Denmark against Sweden. His army was defeated before Narva by Charles XII. in November of the same year, and the war continued with varied success until June 15, 1709, when Charles XII., having rashly marched into the Ukraine, was completely defeated by the Russian army under Peter at Pultown. Charles himself escaped to Bender, but his army was totally annihilated. Peter had in the mean time found it necessary to divorce his wife, who had supported the factious party, and in March 1711, he married the widow of a serjeant in the Swedish service, named Catherine Alexina, who having been taken prisoner by the Russians, had been protected by General Bauer, had subsequently become the mistress of Menzikoff, and afterwards became the mistress of Peter himself. She accompanied her husband immediately afterwards to the war with Turkey, which had just broken out. Peter crossed the river Pruth near Jassy, marched some way down the right bank, and was hemmed in by the army of the grand-vizier on one side, and the Tartars of the Crimea on the opposite shore of the river. After three days' action, the situation of the army became desperate, when Catherine, unknown to her husband, sent a letter to the grand-vizier, with a present of all the plate and jewels she could collect in the camp. After some delay a treaty of peace was signed, by which Peter gave up the towns of Azof and Taganrog, and the vizier supplied the Russian army with provisions. Peter having made a short stay at Carlsbad and Dresden, succeeded in obtaining possession of Pomerania and the coast of Finland. He next defeated the Swedish fleet in a naval engagement. In 1713 the senate was removed from Moscow to St. Petersburg, which city Peter had founded in 1703, and the emperor's summer and winter palaces were completed in 1715. Peter made a second tour through Europe in 1716, accompanied by the Empress.

His eldest son, Alexis, who had been left to the guardianship of his mother, had always been a source of disquietude and trouble to Peter. He had joined with the most turbulent of his subjects, and all remonstrances being treated with neglect, Peter forced him, Feb. 14, 1718, to sign and swear to a deed wholly renouncing the succession to the crown: he also required from him the names of his advisers in his misconduct. The answers given by Alexis to the queries put to him were such, that Peter thought it necessary to try him by the great officers of state, the judges, and the bishops, who unanimously condemned him to death. On the day of his condemnation, he was seized with a violent illness, which terminated in two days, July 7, 1718. In 1719 the Czar's son by Catherine, in whose favour Alexis had abdicated, died at five years of age. On Sept. 10, 1721, the peace of Neustadt was concluded, by which Sweden ceded to Russia, Livonia, Esthonia, Ingria, Carelia, Wyburg, and the adjacent islands, but secured the possession of the Gulf of Finland.

Peter had now attained the summit of his glory: he was requested, and after some hesitation, consented, to adopt the titles of Peter the Great, Emperor of all the Russias, and Father of his Country. He now turned his undivided attention to the arts of peace. He commenced canals to unite navigable rivers; encouraged by bounties the manufactures of woollen and linen cloths, and the erection of corn, powder, and sawing mills; he instituted hospitals, and established a uniformity of weights and measures.

In 1722 Peter led an expedition to the Caspian, which however failed in producing any results. In 1723 he went to St. Petersburg to found the Academy of Sciences, and to erect a memorial of the establishment of a navy in Russia. He died, Jan. 28, 1725.

Catherine, who was immediately proclaimed Empress, died in 1727. She was succeeded by

PETER II., son of Alexis, by the Princess of Wolfenbüttel. He was left in the guardianship of Menzikoff, who affianced his daughter to the young Czar. Peter felt the greatest repugnance to her, and in consequence, with the help of Dolgorouki, his tutor, caused Menzikoff to be arrested and banished to Siberia. His great wealth was forfeited, and he was only allowed out of it 10 rubles a day for his support. Peter II. died at Berezof, in 1729.

PETER III. [RUSSIA.]

PETER'S COLLEGE, ST., commonly called *Peterhouse*, the earliest endowed college in the university of Cambridge, was founded in 1257 by Hugh de Balsham, then sub-prior, afterwards bishop of Ely, who having purchased two hostels, one of them belonging to the Friars of Penance, united them, and appropriated the building for the residence of students; but it was not till 1280, after his promotion to the see of Ely, that he endowed the college with revenues for the support of a Master, 14 Fellows, 2 Bible-Clerks, and 8 Poor Scholars. After his death a new college was built on the site of the two hostels, for which purpose the bishop gave by will the sum of 300 marks; he gave them also the church of St. Peter.

The Fellowships are open without restriction to natives of any part of the British dominions, but no one is eligible who is M.A., or of sufficient standing to take that degree. Besides the foundation Fellowships there are 8 Bye-Fellowships; and 2 Fellowships and 4 new Scholarships were added some few years ago. The rest of the Scholarships, 58 in number, of different value, are paid in proportion to residence.

This college stands on the west side of Trumpington Street, and consists of two courts, the larger of which is 144 feet by 84. The chapel, which stands in the lesser court, was built in 1632. The master's lodge is a detached building on the opposite side of the Trumpington Street.

The number of members upon the boards in 1848 was 240.

PETERHEAD. [ABERDEENSHIRE.]

PETERHOUSE. [PETER'S COLLEGE, ST.]

PETERBOROUGH. [NORTHAMPTONSHIRE.]

PETERBOROUGH, LORD. [MORDAUNT.]

PETERS, BONAVENTURA, one of the most eminent marine painters of the Low Countries, was born at Antwerp in 1614. The subjects which he in general preferred were storms at sea, 'in which,' says Pilkington, 'he represented with extraordinary truth and pathos the various cir-

cumstances that can fill the mind with pity and terror.' His best works are extremely valuable and scarce. He died in 1652, aged 38 years.

John Peters, brother of Bonaventura, was born at Antwerp in 1625. He painted the same subjects as his brother, and his pictures are as finely touched, as well coloured, as transparent, and are also enriched with excellent figures.

PETERSBURG, ST., a government of European Russia, extends from 57° 56′ to 60° 35′ N. lat., and from 21° 5′ to 33° 52′ E. *long.* It is bounded on the north by the Gulf of Finland, Finland, and Lake Ladoga; on the east by Novogorod; on the south by Pskow; and on the west by Lake Peipus and Esthonia.

The country is for the most part level, and in the north-east part it is low, and full of swamps and morasses. In the south it is rather more elevated. There are many forests, and some good arable land. The principal lakes are the Ladoga, Peipus, and Pskow; and the chief rivers are the Neva, the Luga, the Narova, and the Wolchow. The Neva, although only 40 miles long, is the most important of the rivers, owing to its course through the city of St. Petersburg. The area of the government is about 18,000 square miles. The population is about 900,000.

The agriculture is very limited, but much garden produce is raised in the vicinity of the metropolis. Geese and other poultry are reared in great numbers. The trade and manufactures are mostly confined to the capital. Besides St. PETERSBURG, CRONSTADT, and NARVA, the chief towns are Gatschina (7000 inhabitants), and Jamburg (2000 inhabitants).

PETERSBURG, ST., the capital of the Russian Empire, is situated in 59° 56′ N. lat., and 30° 18′ E. long., at the eastern extremity of the Gulf of Finland, and at the mouth of the river Neva. The population in 1848 was 443,000. In 1703 Peter the Great chose this spot, then just taken from the Swedes, for the site of a fortified seaport; but he afterwards perceived its fitness for a metropolis.

The Neva, on the banks and islands of which the city is built, empties itself into the Gulf of Cronstadt by four mouths. The city is of a circular form, but rather irregular. The circuit is about eighteen miles, but only the smaller portion of the area is covered with buildings. The most considerable and the handsomest portion is the southern, on the left bank of the Neva, including the four Admiralty quarters; between this and the northern or right bank of the Great Nevka, lie, from south to north, 1, Wassily-Ostrov; 2, St. Peter's Island, the Island of Petrovsky, and the Apothecaries' Island; 3, Kammenoi-Ostrov, Krestovsky, and Yelagin, a group of islands covered with gardens, groves, avenues of trees, and country-houses, which in summer are the resort of the rich. The city is divided into twelve districts, and these again into quarters. Few cities have such long and broad streets as St. Petersburg. They are from 60 to 120 feet broad; and the Nevsky Perspective is 14,350 feet long, the Great Perspective 10,220, and eight others 6000. There are two bridges of boats over the Neva, and three over its arms; one of them, the Troitskoi or Suwaroff Bridge, is 2456 feet long. These bridges are all removed whenever danger is apprehended from the ice, both at the beginning of the winter and in the spring. There are above seventy bridges over the canals, many of which are of granite, and several of cast-iron; two are handsome suspension bridges, and many are of wood. The quays along the banks are almost unequalled in Europe for extent and beauty. There are 140 Russian-Greek churches, 40 of other Christian communities, 2 Greek convents, a synagogue, and a mosque. Divine service is performed in fifteen languages. Of the Greek churches the finest is the new Isaac Church, which is constructed entirely of marble. The number of palaces and public buildings is very great. The chief are—the Imperial Winter Palace, Hermitage Palace, Marble Palace, Taurida Palace, Anitchkov Palace, Old Michailov Palace, New Michailov Palace, the Admiralty, the splendid building belonging to the general staff, the Senate House, General Synod, Palace of the War Department, the Alexander Theatre, the Assignat Bank, the New Arsenal, the Great Bazaar, the Academy of the Fine Arts, &c., &c. The Field of Mars, adorned with a statue of Suwaroff, is extensive enough to allow 40,000 or 50,000 men to be reviewed in it. The most recent of the public monuments is the Alexander Column, erected in honour of the Emperor Alexander. There are also a colossal equestrian statue of Peter the Great, and a granite obelisk, 82 feet high, in honour of Romanzov.

St. Petersburg contains a university, several academies, gymnasia, seminaries, and numerous schools. The imperial public library consists of above 400,000 volumes; that of the academy of sciences, of 100,000; and almost every establishment has its own library. The museums are all richly stored with specimens. The charitable institutions are rivalled in number by those only of London.

The cold at St. Petersburg in winter is intense, but the air is clear and bracing. The summer is bright and warm, though short; but the autumn is damp and disagreeable. There are numerous country-houses on the islands, and on the road to Peterhof, Strelna, and Oranienbaum. Of the islands in the Neva, north of St. Petersburg, that of Krestovsky is the most beautiful; the isle of Yelagin has an imperial summer palace with a fine park. Peterhof, on the Bay of Cronstadt, the road to which is a noble causeway bordered by fine gardens and country-seats, has a large garden and fine waterworks. Oranienbaum, on the Gulf of Finland, is still more beautifully situated than Peterhof. Zaraskoje-Selo is a very magnificent imperial country-seat, with an immense park and noble gardens. At a short distance is the Pulkowaberg, on which the Emperor Nicholas has caused a fine observatory to be erected, and furnished with the best instruments.

St. Petersburg is not only the capital but the greatest manufacturing city of the empire. There are above two hundred manufactories of different descriptions, some carried on by private individuals, of silk, cotton, woollen, leather, glass,

gold and silver articles, watches, surgical instruments, paper, snuff and tobacco, sugar, &c. There are others which the government has considered it advisable to carry on upon its own account; such are the great manufactory of tapestry, a large manufactory of aqua-fortis, an assay-office and a mint, a plate-glass manufactory, a porcelain manufactory, a great manufactory of cotton and linen, and a cannon-foundry and powder-mills.

The commerce of St. Petersburg is very considerable. Cronstadt is the harbour. The exports are hemp, flax, tallow, leather, iron, tobacco, canvass, coarse linen, bees'-wax, linseed, linseed-oil, tar, potash, &c. The imports are colonial produce of all kinds, manufactures of silk, cotton, hardware, French wines, jewellery, and all articles of luxury and fashion. The trade with England is greater than with any other country.

PETERSFIELD, a market-town and parliamentary borough in Hampshire, is situated on the road from London to Portsmouth, 16 miles E. by S. from Winchester. It is a clean town, partly lighted with gas, and well supplied with water. The trade of the place is small. Population of the town, 1448. The parliamentary borough, which returns one member, includes several parishes and tythings, and contained in 1841 a population of 5201.

PETERWARDEIN, the principal and frontier fortress of Austrian Slavonia, is situated in 45° 15′ N. lat., 19° 55′ E. long., in the neighbourhood of some mountains and fruitful hills, on the right bank of the Danube, near the angle formed by the sudden change in the course of that river from due south to east. On a rock isolated on three sides stands the upper fortress and the hornwork; at the northern foot of the rock is the lower fortress, which includes what is properly the town, and is partly on a gentle slope. Peterwardein is a place of extraordinary strength both by nature and art. As a precaution in case of a very close siege, a well has been excavated in the rock to a depth below the surface of the Danube. The lower fortress has very broad and deep moats, which may be filled with water from the Danube, lofty walls, and many bastions and ravelins, by which it is separated on the south side from the two suburbs Ludwigsthal and Rochusthal. One principal street, and two others parallel to it, with a pretty extensive parade, form the whole town. The principal buildings are the arsenal, the residence of the commandant, and the Catholic church. The population is stated to be 3860, not including the garrison. The fortress is capable of containing a garrison of 10,000 men. Peterwardein is connected, by a bridge of boats over the Danube with the Hungarian town of Neusatz, on the opposite bank, which has a population of about 17,000.

PETIOLE is that part of the leaf commonly called the stalk; it is usually a contracted part of the leaf through which the wood-veins pass from the trunk, but in other cases it is thin, expanded flat, or rolled up in a sheathing manner, when it is scarcely to be distinguished from the blade of the leaf itself.

PETIS DE LA CROIX, FRANÇOIS, born at Paris towards the close of 1653; was the son of the king's interpreter for the Oriental languages, and received an education to qualify him for the same employment. At the age of sixteen he was sent, by the minister Colbert, to reside in the East. He spent several years at Aleppo, Ispahan, and Constantinople, where he became master of the Arabic, Persian, and Turkish languages. After his return to France he was employed on several public occasions, in which his knowledge of the Oriental languages was useful. In short, it was through his intervention that all the affairs between France and the Eastern courts were transacted from 1680 to the time of his death. In 1692 he was appointed professor of Arabic in the Collège Royal de France, and on the death of his father in 1695, the place of Oriental interpreter was given him. He died at Paris, in December 1713. His principal published works are 'Les Mille et un Jours,' translated from the Persian; his 'Contes Turcs;' and the 'History of Timur,' translated from the Persian. Many other works still remain in manuscript.

PETIT, JEAN LOUIS, was born at Paris in 1674. He acquired at an early age great skill in anatomy, and at the age of 16 he was apprenticed to a surgeon. In 1692 he obtained the post of surgeon in the army, and was in active service till 1700, when he returned to Paris and obtained the degree of Master in Surgery. Here he delivered several courses of lectures to a school of anatomy and surgery which he established, and in which many of those who were afterwards among the first surgeons in Europe were pupils. His reputation rapidly increased, and he was elected a member of the Academy of Sciences at Paris, of the Royal Society of London, and of many other learned societies. In 1731, at the foundation of the Academy of Surgery in Paris, of which he was one of the most active promoters, he was elected director. He died in 1760. Petit was for many years the most renowned surgeon in Europe, and contributed more to the advancement of surgery as a science than any one who had preceded him. At the time of his death he had been engaged 12 years in the composition of an extended 'Treatise on Surgery.' It was completed and published in 1774, by De Lesne, and is still a standard work. The other most important of his surgical writings is a 'Treatise on the Diseases of the Bones.'

PETITION. A petition is an application in writing, addressed to the lord chancellor, or the master of the rolls, in which the petitioner states certain facts as the ground on which he prays for the order and direction of the court. Petitions are either *cause* petitions or not. A cause petition is a petition in a matter of which the court has already possession by virtue of there being a suit concerning the matter of the petition; and the petitioner is generally either a party to such suit, or he derives a title to some interest in the subject matter of the suit from a party to it. When there is no suit existing about the matter of the petition, it is called an *ex parte* petition.

PETITION OF RIGHT. In the first parliament of Charles I., which met in 1626, the Commons refused to grant supplies until certain

rights and privileges of the subject, which they alleged had been violated, should have been recognised by a legislative enactment. With this view they framed a petition to the king, in which, after reciting various statutes by which their rights and privileges were recognised, they pray the king, 'that no man be compelled to make or yield any gift, loan, benevolence, tax, or such-like charge, without common consent by act of parliament,—that none be called upon to make answer for refusal so to do,—that freemen be imprisoned or detained only by the law of the land, or by due process of law, and not by the king's special command, without any charge,—that persons be not compelled to receive soldiers and mariners into their houses against the laws and customs of the realm,—that commissions for proceeding by martial law be revoked: all which they pray as their rights and liberties according to the laws and statutes of the realm.'

To this petition the king at first sent an evasive answer: 'The king willeth that right be done according to the laws and customs of the realm, and that the statutes be put in due execution, that his subjects may have no cause to complain of any wrongs or oppressions contrary to their just rights and liberties, to the preservation whereof he holds himself in conscience obliged as of his own prerogative.' This answer being rejected as unsatisfactory, the king at last pronounced the formal words of unqualified assent, 'Let right be done as it is desired.' (1 Car. I. c. 1.) Notwithstanding this however, the ministers of the crown caused the petition to be printed and circulated with the first insufficient answer.

PETITION OF RIGHT. If the crown or a subject has a cause of action against a subject, the ordinary mode of proceeding is by the king's writ, requiring the party to appear in court to answer the complaint. If the claim is against the crown itself, the mode of proceeding provided by common law is to present a petition to the crown, praying for an inquiry and for the remedy to which the party conceives himself to be entitled. As by Magna Charta the king is not to delay right, he is bound, if the petition presents that which has the semblance of a legal or equitable claim, to indorse the petition with the words 'let right be done;' which indorsement operates, in the case of a claim of a legal nature, as a warrant and command to the lord chancellor to issue a commission to inquire into the truth of the matters alleged in the petition.

PETITOT, JEAN, was born at Geneva in 1607. He was placed with M. Bordier, a jeweller, who employed him in preparing enamels for jewellery. In conjunction with Bordier, he made several improvements in enamelling, and applied the art to miniature-painting. They came together to England, where Petitot was introduced to Charles I., who retained him in his service, and gave him apartments in Whitehall. He painted portraits in enamel of Charles and the royal family several times. On the death of Charles, Petitot retired to France with the exiled family. Louis XIV. appointed him his painter in enamel, and granted him a pension and apartments in the Louvre. On the revocation of the Edict of Nantes, Petitot retired to Switzerland, where he died in 1691.

Bordier, in conjunction with whom he worked for 50 years, painted the hair, backgrounds, and draperies of his pictures. In the museum of the Louvre there are many portraits by Petitot; but his principal work is a magnificent whole-length portrait of Rachel de Rouvigny, countess of Southampton, in the collection of the Duke of Devonshire, painted from the original in oil by Vandyck. Petitot may be called the inventor of enamel painting; he was certainly the first who brought the art to perfection.

He had a son, *Jean Petitot*, who followed this art in England, but his pictures are inferior to those of the father.

PETIVE'RIA, a genus of plants belonging to the natural order *Petiveriaceæ*. The species are West Indian herbs, and in pastures are troublesome weeds, giving an unpleasant flavour to the milk of cows which feed upon them. *P. alliacea*, Guinea-Hen Weed, is a small bush with a disagreeable odour. The juices of this plant are excessively acrid, and if a small portion of it be chewed it will render the tongue as dry, rough, and black as in cases of malignant fever.

PETRA, which lay nearly half way between the Dead Sea and the head of the Ælanitic Gulf, was one of the most important towns in the north of Arabia, and the capital of the Nabathæi. This town, which originally belonged to the Edomites, was taken by Amaziah, king of Judah, who changed its name into that of Joktheel (2 Kings, xiv. 7; compare Joseph., 'Antiq.,' ix. 9. s. 1); but it seems in later times to have belonged to the Moabites. (Isaiah, xvi. 1.)

Petra is described by Strabo (xvi., p. 779) and Pliny ('Hist. Nat.,' vi. 32) as situated on level ground about two miles in circumference, and surrounded by precipitous mountains. The town itself was well watered, but the surrounding country, and especially the part towards Judæa, was a complete desert. The ruins of Petra still exist in the Wady Mousa, two days' journey from the Dead Sea, and the same distance north-east of Akaba. Nearly at the termination of a narrow valley extending for nearly two miles, which formed the principal entrance to the town, there are the ruins of a magnificent temple, entirely cut out of the rock.

PETRARCA, FRANCESCO, born at Arezzo, in July, 1304, was the son of Pietro, or Petracco (an idiomatic form of Pietro), a notary of Florence, who was banished in 1302, at the same time as Dante and others of the Bianchi faction. The true name of Petrarca was Francesco di Petracco, or 'Francis the son of Petracco,' which he afterwards changed into the more euphonic name of Francesco Petrarca. After studying grammar and rhetoric at Avignon, where his father resided, he was sent to Bologna to study law, but he paid little attention to it, occupying his time in classical studies. His father and mother died at Avignon nearly about the same time, and Petrarca then returned to Avignon.

The Papal court of Avignon was very gay and even licentious; and Petrarca, then only 22 years of age, and of a handsome person, was one of the gayest in the fashionable circles. But his love of pleasure was tempered by the love of study. Cardinal John Colonna gave Petrarca apartments in his own palace, and became his patron. Azzo da Correggio, lord of Parma, having come to Avignon to defend his title to that sovereignty against the claims of Marsiglio Rossi, Petrarca acted as his advocate at the Papal chancery court, and won the cause.

On April 6, 1327, while he was attending service in the church of St. Clair, at Avignon, he was struck with the beauty of a young lady who happened to be near him, and he conceived a violent passion for her. The lady's name was Laura. According to the received opinion, supported by documents, for Petrarca himself never mentions her family name, she was the daughter of Audibert of Noves, a small place in the territory of Avignon. She had a considerable fortune, and had been married about two years to Hugh de Sade, a gentleman of Avignon: when Petrarca first saw her, she was 19 years of age. In her conduct for a long course of years towards her handsome, accomplished, and impetuous admirer, she exhibited a rare mixture of firmness and courtesy, of respect for her own character with a considerate regard for her enthusiastic lover. He gave vent to his feelings in poetry. She was probably flattered by his praise, which brought no imputation on her character, and made her the most celebrated woman of her day. Petrarca's sonnets and canzoni in praise of Laura circulated throughout Europe. Wishing, if possible, to forget Laura, he formed a connection with another woman, and had by her a son, and afterwards a daughter. But still his mind recurred perpetually to the object of his first attachment. He took care of his illegitimate children, but broke off the connection. For several years he fixed his residence at Vaucluse, a solitary romantic valley near Avignon, on the banks of the Sorga, of which he has given some beautiful descriptions.

Meantime, year after year rolled on, and the beauty of Laura faded away. She became the mother of a large family; but Petrarca continued to see her with the eyes of youth. In 1348, while Petrarca was staying in Italy, the plague spread into France and reached Avignon. Laura was attacked by the disease, and she died after three days' illness, on the 6th of April, in the 40th year of her age.

Here begins a new period of the life of Petrarca, and with it the second part of his love-poetry. Hitherto he had written verses in praise of Laura; he now wrote verses 'on Laura's death.' He fancied himself in frequent communion with her spirit; he describes her appearing to him in the middle of the night, comforting him, and pointing to heaven as the place of their next meeting.

But the life of Petrarca was not spent in idle though eloquent wailings. He was an active labourer in the field of learning, and this constitutes an important addition to his merit and his fame. Wherever he went he collected or copied MSS., and purchased medals and other remains of antiquity. He was the friend and instructor of Boccaccio, John of Ravenna, and other Italian and foreign contemporaries. He was the founder of the library of St. Mark at Venice. He encouraged Galeazzo Visconti to found the university of Pavia. In his extensive correspondence with the most distinguished persons of his time, he always inculcated the advantages of study, of the investigation of truth, and of a moral conduct. Petrarca acted an important part in the affairs of state of his time. His influence over the great and powerful is one of the most extraordinary parts of his character, but it is a well-ascertained fact. He enjoyed the friendship of several popes, of the Correggio lords of Parma, of the Colonna of Rome, the Visconti of Milan, the Carrara of Padua, the Gonzaga of Mantua, of Robert, king of Naples, and of Charles IV., emperor of Germany. He was invited in turn by them all, was consulted by them, and was employed by them in several affairs of importance. In 1340 he went to Rome, on the invitation of the senate, and in 1341, as a reward for his poetical merit, he was crowned with laurel in the Capitol, in the presence of a vast assemblage of spectators.

Petrarca had ecclesiastical benefices at Parma and at Padua, which were given to him by his patrons of the Correggio and Carrara families, and he spent much of his time between those towns. Petrarca was subject, late in life, to palpitations and epileptic fits. In 1370 he removed to Arquà, a village in the Euganean Hills, where he enjoyed a pure air and retirement, and this is the only residence of the numerous houses which he had at Parma, Padua, Venice, Milan, Vaucluse, and other places, which still remains, and is shown to travellers. His health grew worse, and on the morning of July 18, 1374, one of the servants entered his library and found him dead, sitting with his head leaning on a book. He was buried in the parish church at Arquà.

The works of Petrarca are of three kinds: 1, his Italian poetry, chiefly concerning Laura; 2, his Latin poetry; 3, his Latin prose. His Italian poetry, called 'Il Canzoniere,' or 'Rime di Petrarca,' consists of above 300 sonnets, about fifty canzoni, and three short poems, in terza rima, styled 'Trionfo d'Amore,' 'Trionfo della Morte,' and 'Trionfo della Fama.' Petrarca's 'Canzoniere' has gone through more than three hundred editions, with and without notes and commentaries. The best is that edited by Professor Marsand, 2 vols. 4to., Padua, 1819-20, with a biography of Petrarca, extracted from his own works.

Petrarca's Latin poetry consists, 1, of the 'Africa,' an epic on the exploits of Scipio in the second Punic war, a dull sort of poem, with some fine passages: it was however much admired at the time; 2, Epistles, in verse, addressed to several popes, for the purpose of urging their return to Rome, and also to several friends; 3, Eclogues or Bucolics, which are acknowledged by himself to be allegorical, and were in fact, like Boccaccio's Eclogues, satires against the powerful

of his time, and especially against the Papal court of Avignon.

The Latin Epistles of Petrarca are the most important of his prose writings. Those which have been published are classed as follows:—1, 'Epistolæ de Rebus Familiaribus,' in viii books; 2, 'De Rebus Senilibus,' written in Petrarca's old age, in xvi books; 3, one book 'Ad Viros quosdam ex Veteribus Illustriores;' these epistles are addressed to various historical characters of antiquity; 4, one book 'Variarum Epistolarum;' 5, one book 'Epistolarum sine Titulo.' He also wrote several works in Latin prose, chiefly on philosophical subjects. Petrarca's 'Opera Omnia' were published at Basel, in 1581, 2 vols. folio. Biographies of Petrarca have been written by Villani, Vergerio, Tomasini, Leonardo Aretino, and many others: one of the best is Baldelli 'Del Petrarca e delle sue Opere,' 2 vols. 8vo.

PETRELS, the English name for the *Procellaridæ*, a family of oceanic birds, well known to the seaman when far from the land, and with which his superstition was once more busy than it is now; but even at the present day they are not unfrequently regarded as ominous, and many a hard-a-weather old quarter-master still looks upon Mother Carey's Chickens as the harbingers of a storm.

Though zoologists have differed as to the genera to be included in this extraordinary group, they have been pretty well agreed as to the forms which should be congregated in it. [LARIDÆ.]

In the *Procellaridæ*, the upper mandible, which is furrowed into distinct segments, terminates in an abruptly hooked nail, or dertrum, and the under mandible also terminates in a sort of hard distinct nail. The nostrils are more or less decidedly tubular, and sometimes the tubes are united together. The anterior toes are webbed: the hind toe is either wanting or rudimentary. Their flight is very buoyant. Many species eject a considerable quantity of oil from the nostrils, either from fear, or by way of defence. Their bodies are saturated with oil, from the nature of the food on which they subsist, namely, blubber, fishes, mollusks, and crustacea. We cannot here enter into details relative to the minute characters of the genera, or the habits, often replete with interest, of the numerous species which are at present known. On these points we must refer to Latham, Selby, Gould, Lesson ('Zool. de la Coquille'), Temminck, Pennant, Bennett ('Wanderings in New South Wales'), Mr. G. R. Gray ('List of the Genera of Birds'), and to the Prince of Musignano ('Geogr. and Comp. List').

The following genera claim notice:—

Genus I. *Pelecanoïdes*, Lacépède (*Haladroma*, Illiger; *Puffinuria*, Lesson).

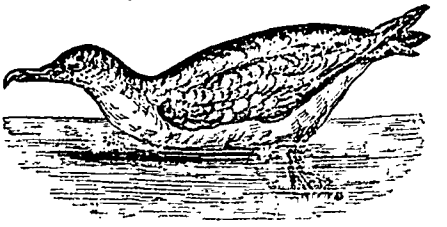
Example.—The Grebe Petrel (*Pelecanoïdes urinatrix*).

Locality and Habits.—This species is found in great flocks along the coast of Peru, flying moderately well in a precipitous manner, and skimming the sea, but it prefers repose on the surface, and dives very frequently, like the Grebes, doubtless for the purpose of capturing the small fish which form its food. M. Garnot thinks that it is intermediate between the Petrels, whose bill and feet it very nearly possesses, and the Grebes, whose port and habit of diving it has; and hence he proposes for it the name of the Grebe-Petrel. The parts between Sangallan and Lima are the localities mentioned by M. Garnot. It is also found in the Australian seas. (See also Darwin's 'Journal and Remarks.' The genus is there called *Puffinuria*.)

Genus II. *Puffinus*, Ray. (*Thiellus*, Gloger; *Thalassidroma*, Swainson; *Nectris*, Klug.)

Example.—The Manks Shearwater (*Puffinus Anglorum*).

This is the *Procellaria Puffinus* of Brunnich and Latham, *Puffinus Arcticus* of Faber, *Der Nordische und Englische Sturmtaucher* of Brehm, *Pétrel Manks* of Temminck, and *Shearwater Petrel, Manks Puffin*, and *Manks Shearwater* of the British.



Shearwater (*Puffinus Anglorum*).

Locality, the Orkneys, the coasts of South Wales, rare in Norway, common on the banks of Newfoundland.

Mr. Selby ('Illustrations of British Ornithology'), who gives Lyre, Shearwater, and Scrabe, as the provincial names of the bird, remarks, that from the accounts transmitted to us by the authors above quoted, this species appears, at the time they wrote, to have resorted in great numbers to the Calf of Man; but from the information which Mr. Selby obtained, confirmed by the testimony of Sir W. Jardine (who visited the Isle of Man a few years ago with the express view of ascertaining this and some other points connected with ornithology), it seems now to be entirely deserted by these birds, a circumstance in all probability occasioned by the wanton and greedy destruction of their eggs and young. Mr. Selby, not having extended his inquiries to the Scilly Islands, is unable to say whether it is now to be found there; but he states that it is still abundant in the Orkneys, where it breeds in holes scratched in the earth that fills up the interstices of the rocks and bold headlands, and is, according to Low, the main object of pursuit with the Rockmen, who endanger their lives in climbing the most awful precipices for the eggs and young of water-fowl. 'Like the rest of the genus,' continues Mr. Selby, 'this bird lays but one white egg, of a rounded form, being equally obtuse at each end, and not inferior in size to that of a domestic fowl. It arrives at its breeding station in February or March; and soon after August, when its young is able to fly, deserts it for the open sea, migrating, as the winter approaches, in

a southerly direction towards the coast of Spain, the Mediterranean, &c. In Britain it is almost entirely confined to the western coast, being of very rare occurrence on the eastern, where I have only met with one individual, which was shot upon an excursion to the Fern Islands.' Several species of this genus are described. (Gould's 'Birds of Europe.') Mr. Gould describes and figures, in his 'Birds of Australia,' four species.

Genus III. *Daption*, a genus established for the reception of the *Procellaria Capensis* of Linn.

Example.—The Cape Pigeon, or Pintado Pigeon, or Pintado Petrel (*Daption Capensis*), a species abounding in all the temperate latitudes of the southern seas.

Genus IV. *Thalassidroma*, or the Stormy Petrels. 'The little tenants of the ocean belonging to this genus are so universally dispersed, that they are found in all the seas except those of the very high latitudes of both hemispheres. The Australian Fauna is particularly rich in birds of this form, inasmuch as no less than five distinct species frequent the seas which wash the shores of that country.'—Gould.

Example.—The Stormy Petrel (*Thal. pelagica*).

Localities.—More common in North America than in Europe; found on the coasts of England and Scotland; rather common at the Orcades and Hebrides; more abundant in the island of Saint Kilda; wanders rarely on the coasts of the ocean, and very accidentally on the lakes of the centre of Europe. (Temminck.) Mr. Selby states that they are found upon the seas surrounding Britain at all seasons of the year, and that they have been ascertained to breed not only upon the Shetlands and other northern islands of Scotland, but upon the rocky coast of the north-west of Cornwall at the opposite extremity of the kingdom. The geographical distribution of this species has, he adds, been supposed to be very extensive; but the discovery of other species very closely allied to it both in size and colour (and only to be distinguished by narrow inspection and comparison) in various parts of the Atlantic and Pacific Oceans, makes it more than probable that these latter have been mistaken for it, and that its distribution is in fact much more limited, being in all likelihood confined to the European seas.

Wilson's Petrel (*Thal. Wilsonii*). Locality, the whole coast of America, and occasionally the coasts of Europe, and of South Africa. (See Wilson, Nuttall, Audubon.) It is the *Procellaria pelagica* of Wilson. The habits and manners of the Petrels have been described alike by naturalists, voyagers, and poets, and have attracted general attention. They skim the rolling billows, picking up from the surface of the agitated surge such marine insects, crustaceæ, and organic exuviæ as may be cast up, with marvellous address. It is for food that they follow the wake of a vessel, often resting on, or tripping over the waves, half on wing, half on foot, with wonderful ease, fearless of the tempest, though leagues and leagues away from land.

Genus V. *Fulmarus*, Leach. Example.—The Fulmar Petrel (*Fulmarus glacialis*, Steph.; *Procellaria glacialis*, Linn.).

Locality, the Polar regions, St. Kilda, Norway, Davis's Straits, Baffin's Bay.

Temminck states that the Fulmar never comes to the coast except for the purpose of nesting, or when driven there by gales. Its flight is easy and buoyant. Besides the flesh and blubber of dead whales or seals, for penetrating whose thick skins their trenchant and hooked upper mandible is admirably formed, barnacles and other parasites which attach themselves to the whales, mollusks, &c., form their food. Captain James Ross says that the bird is of essential service to those employed in the capture of the whale, by guiding them to those places where the whales are most numerous, and by giving notice of the first appearance of those animals at the surface of the water, by crowding to the spot from all quarters. The Fulmar also attends the fishing-vessels on the banks of Newfoundland, where it is called John Down, for the offal of the cod-fish, and is often taken with a hook baited with a piece of cod's liver or flesh. At St. Kilda they breed gregariously in the caverns and holes of the rocks. A single large white egg, with a very brittle shell, is deposited by the female, and the young, which are hatched about the middle of June, are fed with oily matter disgorged by the parents.

Genus VI. *Procellaria*. Example.—The Great Black Petrel (*Procellaria æquinoctialis*, Linn.). Locality, the southern seas. In flight and general manners this bird resembles the Albatross.

Genus VII. *Diomedeæ*. [Albatross.]

Genus VIII. *Prion*, Lacépède. (*Pachyptila*, Ill.) Example, The Blue Petrel (*Prion vittatus; Procellaria vittata* and *cærulea*, Gmelin). The Blue Petrel was first discovered by Forster. During the voyage of the Coquille, many were captured in 58° S. lat. The habits of this bird much resemble those of the Petrels and Shearwaters. Mr. Gould notices it among the troops of wild fowl which followed his vessel for some thousands of miles, and of which he says, 'Until I had ascertained that they were nocturnal, it was a matter of surprise to me, how the birds which were seen around the vessel at nightfall, were to be observed crossing our wake the following morning at daybreak, the ship having frequently run to a distance of nearly one hundred miles during the night. (See Mr. Gould's 'Letter in Proc. Zool. Soc.,' 1839, for some interesting notices of oceanic birds.)

PETRIFACTIONS, one of the general terms by which naturalists have at different times sought to designate the vast variety of plants and animals whose remains are preserved in the earth. It may be thus considered as an equivalent for such expressions as 'formed stones,' 'imbedded fossils,' 'organised fossils,' 'organic remains,' &c. None of these expressions are free from objections, but the difficulty of superseding them by better is more obvious than the advantage of changing them. Against the use of the word Petrifactions, it is reasonably argued that a very considerable proportion of the plants, shells, and bones of vertebrated animals inclosed in the rocks are not at all petrified; while, on the other hand, the process of lapidification has been found to have

been perfectly performed on objects of comparatively recent date never imbedded in the earth, as the wood of a Roman aqueduct in Westphalia. Calcareous deposits from springs, which invest mosses, shells, and bones with a stony case, are often called petrifactions.

PETRO'LEUM, a viscid variety of bitumen, which is found in many parts of Europe and America, but chiefly in Asia, flowing from beds associated with coal strata. It has a dark reddish-brown colour; it is slightly translucent, and its odour is bituminous. When petroleum is heated to nearly 450°, drops of an oily fluid come over, though very slowly; this oily body has a brown colour, and is very liquid. *Petrolene* is the name given by Boussingault to this oil; it has a pale yellow colour, slight taste, and a bituminous smell. *Asphaltene* is the solid portion of petroleum. Its colour is black, and it has a great deal of lustre. It breaks with a conchoidal fracture, and is heavier than water. It is supposed that petroleum consists of petrolene[4], asphaltene[5].

PETROMY'ZON, according to Linnæus, a genus of fishes, but now usually regarded as a family, called *Petromyzidæ*. These fishes constitute the section *Cyclostomi* of the 'Règne Animal,' and are distinguished by their imperfectly-developed skeleton, their want of pectoral and ventral fins, combined with an eel-like form of body. The mouth is circular, consisting of a cartilaginous ring which supports the lips, this ring being formed by the soldering together of the palatine and mandibular bones. The branchiæ, instead of being pectinated, as in most other fishes, are purse-shaped; they are moreover fixed, and open externally by several apertures.

As examples of this group, we may adduce the Lamprey (*Petromyzon marinus*, Linn.); the Lampern or River Lamprey (*Petromyzon fluviatilis*, Linn.); the Fringe-Lipped Lampern (*Petromyzon Planeri*, Bloch); the Pride or Sandpride (*Ammocœtes branchialis*, Cuv.); the Myxine or Glutinous Hag (*Gastrobranchus cœcus*, Bloch, *Myxine glutinosa*, Linn.); and the Lancelet (*Amphioxus lanceolatus*, Yarrell). The foregoing are all British fishes, and are most admirably described in Mr. Yarrell's work on the subject, excellent figures of each being given. In the Lampreys the mouth forms a sucker, by means of which they attach themselves to stones or rocks, and are thus without exertion enabled to resist the force of currents of water. Formerly, Lampreys and Lamperns were held in high estimation as delicacies for the table; nor is their celebrity in this point altogether extinguished. Potted Lampreys are regarded by many as excellent.

PETRO'NIUS A'RBITER is the name of the author, or supposed author, of a kind of novel in Latin, of which we have only fragments, descriptive of the licentious manners of the Romans under the empire. As a picture of manners, the work is curious, and the style is good. It is uncertain who was the author of the work, or when it was written. The best edition of Petronius is by P. Burmann, 2 vols. 4to., 1743.

PETROPAULOVSKI. [Avatska Bay.]

PETROSELI'NUM, a genus of plants belonging to the natural order *Umbelliferæ*. *P. sativum*, common Parsley, is noticed under Parsley. *P. segetum*, Corn Honewort, is found on damp fields in a calcareous soil in Great Britain, France, and Switzerland. The species are annuals, and are easily cultivated.

PETTY, SIR WILLIAM, an eminent political economist, was born May 16, 1623, at Romsey in Hampshire, where his father carried on the business of a clothier. He studied in France and the Low Countries, and afterwards at Oxford, where he employed himself in giving instruction in anatomy and chemistry. In 1649 he was created doctor of physic, and elected a fellow of Brazenose College. In 1650 he was appointed to the anatomical professorship in the university of Oxford. When the Royal Society was established, he was one of the council. In 1652 he was appointed physician to the army in Ireland. He also acted as secretary to Henry Cromwell, lord-lieutenant of Ireland. He appears however to have been well received by Charles II. at the Restoration, and in 1661 was knighted. Sir William Petty died in Westminster, Dec. 16, 1687. The widow of Sir William Petty was created Baroness Shelburne. He left two sons and a daughter. The eldest son succeeded to the title, but, dying without issue, it was revived in Henry, the second son, great-uncle of the first Marquis of Lansdowne.

Sir William Petty was the author of several scientific works and inventions, and various papers on mathematical and chemical subjects in the 'Philosophical Transactions;' but he is far better known in the present day as a writer upon trade and commerce and political arithmetic. Among his best works are a 'Political Anatomy of Ireland,' a treatise on 'Taxes and Contributions,' 'Political Arithmetic,' and 'Quantulumcunque' (a treatise on money).

PETUNTZE, the Chinese name for a white earth used with kaolin in the manufacture of porcelain. Kaolin is said to be derived from the decomposition of the felspar of granitic rocks. Petuntze is the same mineral which has not suffered decomposition, and on account of its fusibility is employed in glazing the porcelain.

PETWORTH. [Sussex.]

PEUCE'DANIN, a peculiar principle obtained from the *Peucedanum officinale*, or Sea Sulphurwort. The crystals are colourless, acicular, transparent, inodorous, and insipid. They consist of C^{4}, H^{2}, O^{1}.

PEUCE'DANUM, a genus of plants belonging to the natural order *Umbelliferæ* and the tribe *Peucedaneæ*. *Peucedanum officinale*, Sulphurwort, or Hog's Fennel, is native in marshy and shady places throughout Europe and in Great Britain. The juice of the root of this plant is resinous and has a peculiarly strong smell. *P. montanum* is a native of the north and middle of Europe. The whole plant abounds in a white bitter fetid juice, which soon hardens into a brown acrid resin. *P. palustre* is found in Great Britain, but rarely. Any common garden soil will suit the species of Peucedanum, and they are easily raised from seed.

PEUTINGERIAN TABLE is the name given

to a map of the roads of the ancient Roman world, made as some suppose in the third century of the Christian æra; but this is hardly more than a conjecture. It is on parchment, and was found in a library at Speyer in the 15th century. It was bequeathed by the proprietor Conrad Celtes to his friend Conrad Peutinger, a learned man of Augsburg, who began to prepare a copy of it for publication, but died in 1547, before he could effect his purpose. Mark Velter however copied it on a scale less than one-half of its original size, and sent his copy to Ortelius, who forwarded it to Muretus, who published it in 1598. This reduced copy has been inserted in the Ptolemæus of Bertius, in Horn's 'Orbis Delineatio,' and in Bergier's 'Histoire des grands Chemins de l'Empire Romain.' The original map remained at Augsburg, in the possession of Peutinger's descendants, till 1714, when it was purchased by a bookseller, and sold by him to Prince Eugene, who gave it to the imperial library of Vienna. An exact copy of it was made by F. C. von Scheyb, at Vienna, in 1753, with an introduction and index, and dedicated to the Empress Maria Theresa. The map is 21 feet in length, and about one foot wide. It is not however a proper map, but merely a collection of all the great roads of the empire in a long narrow strip, with the stations marked on each road, and the distances, for the information of travellers, and chiefly of military and civil officers. The map extends to the right or east as far as the mouth of the Ganges.

PE'VENSEY. [SUSSEX.]

PEW. The word pew seldom occurs in writers upon ecclesiastical law, who almost invariably use the expression 'church seat.'

There were no pews in churches until about the period of the Reformation, prior to which the seats were movable, such as chairs and benches, as we see at this time in the Roman Catholic churches on the Continent. 'By the general law and of common right,' Sir John Nicholl observed (in Fuller *v.* Lane, 2 'Add. Eccl. Rep.,' 425), 'all the pews in a parish church are the common property of the parish; they are for the use *in common* of the parishioners, who are all entitled to be seated orderly and conveniently so as best to provide for the accommodation of all.' The right of appointing what persons shall sit in each seat belongs to the ordinary (3 'Inst.,' 202); and the churchwardens, who are the officers of the ordinary, are to place the parishioners according to their rank and station; but they are subject to his control if any complaint should be made against them. (Pettman *v.* Bridger, 1 'Phill.,' 323.) A parishioner has a right to a seat in the church without any payment for it. But private rights to pews may be sustained upon the ground of a faculty, or of prescription, which presumes a faculty.

The right by faculty arises where the ordinary or his predecessor has granted a licence or faculty appropriating certain pews to individuals. But it has been decided in the ecclesiastical court that where a party claiming by faculty ceases to be a parishioner, his right is determined. Where a claim to a pew is made by prescription as annexed to a house, the question must be tried at law. The courts of common law in such cases exercise jurisdiction on the ground of the pew being an easement to the house. (Mainwaring *v.* Giles, 5 'Barn. and Ald.,' 361.) In order to support a claim by prescription, *occupancy* must be proved, and also *repair* of the pew by the party, if any has been required. The above observations apply to pews in the *body* of the church. With respect to seats in the chancel, it is stated in the 'Report of the Ecclesiastical Commission,' page 49, 'the law has not been settled with equal certainty, and great inconvenience has been experienced from the doubts continued to be entertained. Some are of opinion that the churchwardens have no authority over pews in the chancel. Again, it has been said that the rector, whether spiritual or lay, has in the first instance at least a right to dispose of the seats; claims have also been set up on behalf of the vicar; the extent of the ordinary's authority to remedy any undue arrangement with regard to such pews has been questioned.'

With regard to aisles or isles (wings) in a church, the whole aisle or particular seats in it may be claimed as appurtenant to an ancient mansion or dwelling-house, for the use of the occupiers of which the aisle is presumed to have been originally built. In order to complete this exclusive right it is necessary that it should have existed immemorially, and that the owners of the mansion in respect of which it is claimed should from time to time have borne the expense of repairing that which they claim as having been set up by their predecessors. (3 'Inst.,' 202.)

The purchasing or renting of pews in churches is contrary to the general ecclesiastical law. Pew-rents, under the church-building acts, are exceptions to the general law; and where rents are taken in populous places, they are sanctioned by special acts of parliament. Pew-rents in private unconsecrated chapels do not fall under the same principle, such chapels being private property.

PEWTER. The finest pewter is said to consist of 12 parts of tin, 1 part of antimony, and a very little copper. Common pewter consists of about 80 parts of tin and 20 of lead.

PE'ZENAS. [HE'RAULT.]

PFEFFEL. [GERMANY, vi., 643.]

PFORZHEIM, a town in the Baden circle of Middle-Rhine, at the foot of the Schwarzwald and at the junction of the Nagold with the Ens. It has 6285 inhabitants. It is surrounded with a wall and moat, and consists of the town and three suburbs. There are four churches and an ancient palace. Among the public institutions are a convent for noble ladies, an hospital, an infirmary, an orphan-house, an asylum for the deaf and dumb, &c. The manufacture of jewellery and trinkets employs above 1000 hands. Watches, superfine cloth and kerseymere, common and Morocco leather, hardware, iron and copper ware, bar-iron, and chemical products, are manufactured. There are besides many dye-houses and bleaching-works; and a very great trade in timber (which is floated down the Neckar and the Rhine to Holland), corn, oil, wine, and cattle.

PHÆDRUS, a Latin writer of the Augustan

age, who appears to have been a native of Thrace, whence he was brought to Rome as a slave. He is said to have been emancipated by Augustus Cæsar. He wrote several books of fables in iambic verse, borrowing, as he says in his prologue, his subjects from Æsop. The 'Fables' of Phaedrus are characterised by the graceful simplicity of the style, the pointedness of their humour, and the general soundness of the morality. The latest edition of Phædrus is by J. C. Orelli, Zürich, 8vo., 1832. The 'Fables' of Phædrus were edited by Bentley, and appended to his edition of Terence.

PHÆNO'GAMOUS or PHANERO'GAMOUS plants are those which have visible flowers and seeds. The words are used indifferently in contradistinction to *Cryptogamous*, which includes those plants which either have no sexes or none which are distinctly visible.

PHALÆNA, one of the three Linnæan genera of Lepidopterous Insects. It corresponded to the division *Nocturna* in the arrangement of Latreille. It included the Night-Moths. The *Phalænæ* are now distributed among many genera, all of which form part of the division *Heterocera* in M. Boisduval's arrangement of *Lepidoptera*.

PHALANX (φάλαγξ), a name given by the Greeks to the whole of the heavy-armed infantry in an army, but particularly to each of the grand divisions of that class of troops. The number of men composing a phalanx was various, but the general depth of the files in the body so called was sixteen men.

The Macedonian phalanx, the formation of which is ascribed to Philip, the father of Alexander, appears to have been a body of 6000 men, chosen for their good military qualities, particularly well armed, and subject to certain strict regulations. Its efficiency was very great.

The *phalangists* were armed with helmets, cuirasses, and greaves; and in the early ages they carried an oval buckler and a pike, the latter about 10 feet long. The change introduced by Philip in the arms of the oplitæ (ὁπλίται), or heavy-armed, consisted in the substitution of a larger shield, and of the σάρισσα, a pike from 18 to 20 feet in length. The arms of the peltastæ (πελτασταί), or middle-armed troops, seem to have differed from those of the oplitæ chiefly in the buckler (whence their designation is derived) being round, and only about two feet three inches in diameter, and in the pike being short. The light-armed troops (ψιλοί) were frequently provided with a helmet only, and their arms were small javelins, bows, or slings.

A phalanx, in line, was considered as being constituted of two equal parts or wings (κέρατα); there was no central division, but the place of junction of the two wings was called the ὀμφαλός. In the usual order of battle it was drawn up with its front parallel to that of the enemy, but it not unfrequently happened that one wing was kept retired. This last method was practised by Epaminondas at the battle of Leuctra; the wing engaged was strengthened so as to have 50 men in depth, and the line gradually diminished to the opposite extremity, where it was only six men deep. Sometimes also two phalanges advanced in columns, with their heads united, the two lines gradually diverging to the right and left; and this is that disposition which was called ἔμβολον, or the wedge.

When standing at open order, each soldier in the phalanx was allowed a square space about six feet each way; but when prepared for action, this was reduced to three feet, and occasionally to about eighteen inches. On a march, the phalanx was thrown into a column, whose breadth depended on that of the road; and a formation of some separate bodies, consisting of 100 men each, for the purpose of protecting the main body while returning to its former order after having passed a defile, is mentioned by Xenophon ('Anabasis,' lib. iii.) as being then, for the first time, employed. The march of two phalanges in parallel and contiguous columns is stated to have been sometimes made by the columns keeping their proper fronts towards the exterior; but sometimes both columns were in like positions, the front of one and the rear of the other being towards the exterior, on the two sides of the line of march.

The strength of a Grecian army consisted in the deep array of its heavy infantry. No body of men less protected by defensive armour could make any impression upon the solid phalanx: and the latter, by the momentum of its charge, could not fail to overwhelm any troops who were differently formed. But the advantage of the phalanx, while it continued embodied, did not extend beyond the immediate field of battle; and the enemy, if he thought proper to decline an engagement, could, without interruption, except that which might arise from the light-armed troops and cavalry, ravage the country, and by cutting off its supplies compel the army to retreat. The phalanx moreover could only be advantageously employed on ground which was nearly level and free from obstacles; since whatever tended to derange its compact order, necessarily diminished or annulled the effect of its charge. At the battle of Issus, the phalanx of Alexander, while in a state of disorder, as the troops were passing the river, was engaged with the Greeks in the service of Darius; and though it succeeded in repelling the enemy, it sustained considerable loss. (Arrian, 'Exped. Alex.,' lib. ii.)

Polybius, in comparing (lib. xvii., extract 3) the efficiency of the phalanx with that of the Roman legion, observes that the latter never opposed the former on a line parallel to its front, but always with one wing thrown back; by which means it broke the line or else compelled the phalanx to change its disposition; in either case there were formed intervals of which the legionary soldiers could avail themselves to engage the phalangists in flank, and thus render their close array and their unwieldy weapons useless.

PHA'LARIS, a tyrant of Agrigentum in Sicily. Eusebius places his accession to power in B.C. 570. He is said to have reigned sixteen years, when he was deposed and put to death. Phalaris, according to the story, was infamous for his cruelty, and especially for the particular device, which he owed to Perillus, of burning his victims

in a bull of bronze, in order that he might enjoy the pleasure of hearing their cries. He is said to have been burnt in his own bull. Certain epistles in Greek are extant, which are called the 'Epistles of Phalaris,' but they have been proved beyond all doubt, by Bentley in his 'Dissertation on the Epistles of Phalaris,' to be a worthless fabrication of some rhetorician or sophist.

PHA'LARIS, a small genus of grasses, of which the seed of one of the species is extensively employed as food for birds, and commonly known as Canary Seed. The species of the genus are found in warm parts of the world; but *Phalaris Canariensis*, a native of the Canary Islands, is naturalised in Europe, and is the only one which is cultivated. The seed is imported into the South of Europe from Barbary. It is also cultivated in the Isle of Thanet and some other parts of Kent.

PHALSBOURG. [MEURTHE.]

PHANTASMAGORIA. [MAGIC LANTERN.]

PHARBI'TIS, a genus of plants belonging to the natural order *Convolvulaceæ*. *P. Nil* has a capsule containing two seeds in each cell. The seeds are sold in apothecaries' shops of Calcutta under the name of 'Kala dana,' and are said to act as a purgative and an effectual speedy cathartic. They are roasted like coffee, powdered, and administered in doses of from 30 to 40 grains. It is a native of the tropics in every part, and of the South Sea Islands.

PHARISEES, a sect among the ancient Jews. Their origin is unknown. Josephus, who was himself one of the Pharisees, speaks of them as flourishing long before he was born. He says ('Antiq.,' b. 13, c. 9), 'At this time (about 150 B.C.) there were three sects of the Jews, the Pharisees, the Sadducees, and the Essenes.' On several occasions he describes the Pharisees as the chief sect, and as possessing great authority among the people. They believed in the existence of angels and spirits, and held the doctrine of the resurrection; but their notion of the latter appears to have been Pythagorean, namely, that there is a resurrection of the soul only by a transmigration into another body. The Pharisees are represented in the New Testament as a hypocritical, proud, and arrogant people, pretending to be emphatically 'the separated,' trusting to themselves that they alone were righteous, and despising all other men. This was their character as a body; but there were among them individuals free from these bad qualities, such as Nicodemus, Joseph of Arimathæa, Gamaliel, and, as some think, Simeon, who uttered the hymn called 'Nunc dimittis.'

PHARMACOLITE, native arseniate of lime. It occurs crystallised and fibrous, and there is a variety, called haidingerite, which differs in crystalline form and composition. About one-half of the weight consists of arsenic acid.

PHARMACOPŒIA, a book published by the colleges of physicians with the sanction of government, containing directions for the preparation of medicines.

PHA'RMACY is that department of natural science which treats of the collection, preparation, and preservation of medicines, and also of the art of dispensing them according to the formulæ or prescriptions of medical practitioners. [MATERIA MEDICA.]

PHARNACES. [PONTUS.]

PHARSALIA. [THESSALY.]

PHARYNX is the cavity in which the food is received in its passage from the mouth to the œsophagus or gullet.

PHASE (*φάσις, phasis*, appearance). When a phenomenon changes its character gradually, any particular state which it is necessary to distinguish is called a phase. Thus we have the phases of the moon, the phases of the weather.

PHA'SEOLUS, a genus of plants of the tribe *Phaseoleæ*, in the natural family of *Leguminosæ*. Two species are very well known in this country, *P. vulgaris*, the Common Kidney Bean, and *P. multiflorus*, the Scarlet Runner; their unripe pods being much esteemed as legumes, and also for pickling. The ripe seeds are however employed on the Continent, and form the *Haricots* of the French.

Phaseolus vulgaris, Kidney Bean, is said to be a native of India, but Dr. Royle states that seeds were brought to him from Cashmere, and he is therefore inclined to consider that it was introduced into Europe from the most northern parts, such as Caubul and Cashmere, and that this accounts for our being able to cultivate it at a lower temperature than other species of the genus. *P. multiflorus*, or the Scarlet Runner, is a native of South America. Both are delicate, and cannot be safely planted in the open air till the beginning of May.

In India several species of Phaseolus are extensively cultivated:—

Phaseolus Mungo is one of the dry leguminous grains of India, which are of great value whenever the periodical rains fail and rice cannot be grown, and famine is the consequence. *P. maximus*, Kala Moog of the natives, and Black Gram of the English, is like the former, but distinguished by its black seeds, and is cultivated. *P. radiatus* is cultivated, and is the most esteemed of all the Indian leguminous plants. *P. aureus* and *P. aconitifolius* are also cultivated.

PHASIANIDÆ. [PAVONIDÆ; PHEASANTS.]

PHASIS, the principal river in ancient Colchis, called at present the Faz, and sometimes the Rion, rises in Armenia, according to Strabo. It flows in a westerly direction into the Black Sea. The Phasis was sometimes considered the boundary of Asia and Europe. It is navigable in the lower part of its course, but a bar at the mouth prevents large vessels from entering it. This river is now in the possession of the Russians, who have a fort near the mouth. The pheasant is said to have been brought from the banks of this river, and hence to have derived its name.

PHAVORI'NUS VARINUS, a native of Favera, a place near Camerinum in Italy, whence he called himself Favorinus, in Greek Phavorinus (*Φαβωρῖνος*). His family name was Guarino, which he turned into Varinus (*Βαρῖνος*). He was bishop of Nuceria, and died in 1537. His chief work is a Greek Lexicon, in which the explanations are in Greek. The first edition was printed

at Rome in 1523, fol. The last edition was printed at Venice in 1712. It is a very useful lexicon, compiled, as the title expresses it, 'from many and different books.'

PHEASANTS. If we owe to America that valuable domestic bird the Turkey, we are indebted to Asia for those important additions to our farm-yards and preserves, the Peacocks, the Pheasants, and our common Poultry.

The views of Mr. Swainson, Mr. Vigors, and Mr. Gray, with respect to the Pheasants, or *Phasianidæ*, are alluded to under the article PAVONIDÆ. Mr. Gray divides the *Phasianidæ* into the following subfamilies: *Pavoninæ*, *Phasianinæ*, *Gallinæ*, and *Meliagrinæ*.

Under the present head we include the *Phasianinæ* and *Gallinæ* of Mr. Gray; of which the following are the principal genera:—

Genus I. *Phasianus*. Examples.—The Common Pheasant (*Ph. Colchicus*, Linn.). This beautiful bird, too well known to need description, appears to have been carried at an early epoch from Western Asia (Mingrelia, formerly Colchis) to Greece, and thence to Italy; subsequently it has spread over the whole of temperate Europe, and the greater part of the Old Continent. At what date it was introduced into our island, we cannot very clearly ascertain; but we learn that the price of one was fourpence in the time of Edward I. A.D. 1299. Subsequently we may trace its history as a valued luxury for the table, and as a noble quarry for the falconer, through various reigns to the present time.

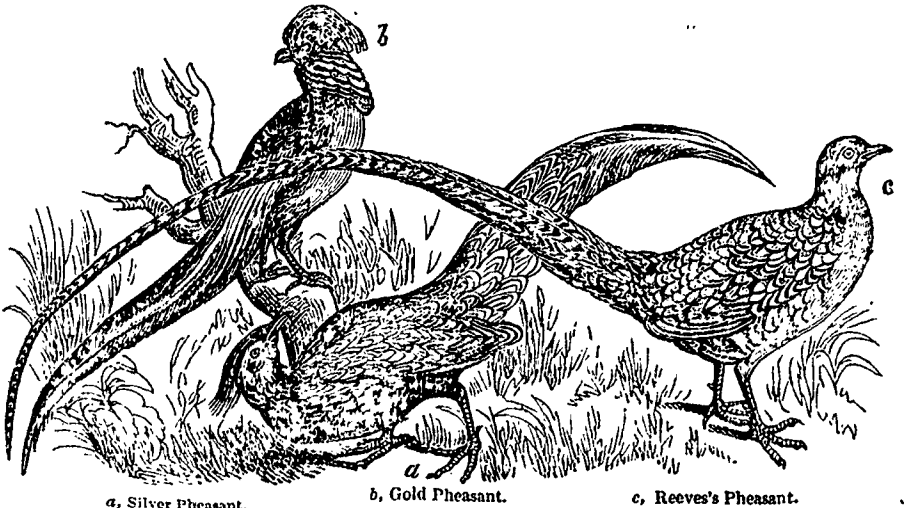
The Pheasant in our country breeds in April, making a rough nest on the ground. The young make their appearance in May. For an admirable account of the habits and manners of this bird, and of the diseases to which it is subject, we refer to Mr. Yarrell's 'History of British Birds,' and to Mr. Selby's 'Illustrations of British Ornithology.'

Female pheasants, assuming the plumage of the male are unproductive, the ovaries being diseased.

Hybrids between the Pheasant and common fowl are by no means rare; but other hybrids have occurred. Edwards figures a bird between the Pheasant and Turkey. Mr. Yarrell notices a cross between the Pheasant and Guinea Fowl. Mr. Eyton, between the Pheasant and Gray Hen (female of the Black Cock.) Similar accounts are also recorded by other observers.

Before we leave the True Pheasants, we must notice some of the magnificent Indian species, which exhibit such a prodigality of splendour and beauty in their plumage as almost realises the descriptions which we read in fairy tales. Such are the well-known gorgeous Gold Pheasant (*Phasianus pictus*, Linn., genus *Thaumalea*, Wagler, *Chrysolophus*, J. E. Gray, *Nycthemerus*, Sw.), the equally well-known delicately pencilled Silver Pheasant (*Phasianus Nycthemerus*, Linn., genus *Gennæus*, Wagler, *Nycthemerus*, Sw., *Euplocamus*, J. E. Gray), and the noble Reeves's Pheasant (*Phasianus veneratus*, Temm., genus *Syrmaticus*, Wagler).

The first two of these (natives of China) are common in almost every aviary, and there is no



a, Silver Pheasant. *b*, Gold Pheasant. *c*, Reeves's Pheasant.

reason why they should not thrive well if turned out in our preserves; the second species has, we believe, been so turned out with success; the last is also found in China, but, as it would seem, on the very confines of the empire. It is very rare in Pekin. Dr. Latham's description was taken from Sir John Anstruther's drawings. It was found on the snowy mountains of Serinagur.

To Mr. Reeves we are indebted for the first individual ever brought alive to Europe. It was a male, and continued to live for some time in the garden in Regent's Park. Tail-feathers from it were exhibited to the Society in 1831, measuring each about five feet six inches in length. A second male specimen was also sent to their menagerie by the same liberal donor in 1834. Hybrids were obtained, one of which is, we believe, still alive at the Garden, from one of these birds and the common Pheasant.

Then there are the beautiful Diard's Pheasant

(*Phasianus versicolor*, Vieill.), which haunts the Japanese woods, and exhibits the manners and habits of our common Pheasant; the rare and elegant Soemmering's Pheasant (*Phasianus Soemmeringii*, Temm.), also a native of Japan.

Genus II. *Euplocamus;* intermediate between the true Pheasants and the Jungle-Fowl (*Gallus*). Example.—The Fire-Backed Pheasant of Java, the Macartney Cock of English authors (*Euplocamus ignitus*, *Phasianus ignitus*, Latham). Locality, Java, Sumatra. Sir G. Staunton, in his 'Embassy to China,' first made this interesting form known to European zoologists.

Genus III. *Gallus.* From one of the species of the genus *Gallus* is derived the domestic fowl, reclaimed at a very remote period, and now spread over the world, ramifying by culture into numerous breeds or varieties. It was reared in our island before the invasion of Julius Cæsar, but for pleasure only, being forbidden as food. ('De Bello Gallico,' lib. v.)

The domestic cock and hen are the ἀλεκτρυών (Alectryon) and ἀλεκτορὶς (Alectoris) of the Greeks; *Gallus* and *Gallina* of the Romans; *Gallo* and *Gallina* of the Italians; *Haus Hahn* and *Haus Henne* of the Germans; and *Coq*, *Gelline*, and *Poule* of the French.

A gigantic species of fowl, known as the Kulm Fowl (*Gallus giganteus*), is reared in a domestic state in the Deccan; but according to Col. Sykes ('Zool. Proc.' 1832), there is reason to believe that it is not a native of India, but has been introduced by the Mussulmans from Sumatra or Java. This species is now not uncommon in our island. Of its habits in a wild state we have no accounts.

Among the wild species we may notice the Bankiva Cock, or Javan Cock of Latham (*Gallus Bankiva*). From this species, which closely resembles a Blackbreasted Red Bantam, it is probable that our ordinary domestic race has sprung. Sir W. Jardine states that he has seen three or four specimens of another bird very closely allied to this, but rather larger, and certainly distinct: they were all from the continent of India. The Bankiva Cock breeds freely with our domestic poultry.

Sonnerat's Jungle Fowl (*Gallus Sonneratii*). In this species the hackles of the neck and of the wing-coverts and tail-coverts are of a dark grayish colour, with bright golden orange shafts dilating in the centre and towards the tip into a flat horny plate. Abundant in the Western Ghauts. According to Col. Sykes, there are two varieties of this bird, if indeed they be not distinct species.

Sonnerat's Jungle Cock is renowned for its indomitable spirit, and is anxiously sought after by the cockfighters in Hindustan, who rely on it for victory when pitted against larger game cocks.

We have also to notice the Bronzed Cock (*Gallus æneus*), figured by M. Temminck from a specimen sent from the interior of Sumatra by M. Diard. This is somewhat larger than the Bankiva Cock, and its large comb is without dentilations; indeed the edge is quite unbroken. The feathers of the head, neck, and upper part of the back, are rather elongated, but not hackles. The Fork-Tailed Cock (*Gallus furcatus*, Temm.; *Gallus Javanicus*, Horsf.) has the comb also entire, and the throat is adorned with a single large wattle springing from the centre. The head, neck, and upper part of the back are covered with feathers, which are not hackles, shorter and more rounded than those in the Bronzed Cock.

Genus IV. *Tragopan*, (Cuvier.) The Tragopans or Horned Pheasants, appear to be intermediate between the typical pheasants and the genus *Meleagris*. [PAVONIDÆ.] Three species are known, viz.: *Tragopan Satyrus*, *Tr. Hastingsii*, and *Tr. Temminckii*. These noble birds are natives of the Himalaya Mountains. Their colouring is extremely beautiful. (See Gould's 'Century of Birds from the Himalaya Mountains.')

In conclusion we have to call the reader's attention to the beautiful *Phasianus Staceii* (figured and described by Mr. Gould in his 'Century') as one of the true pheasants; and to *Phasianus Pucrasia* and *Phasianus albo-cristatus*, also there figured. *Phas. Pucrasia* appears to us to lead the way from the true pheasants to the *Lophophori;* and *Ph. albo-cristatus* to be an *Euplocamus*, which, even more immediately than *Euplocamus ignitus*, forms a transition from the genus *Phasianus* to the genus *Gallus*.

(See the article 'Poultry' in the *Farmer's Library*.)

PHEIDON, the ruler of Argos, lived in the eighth century before the Christian æra. He is said to have been a bold and active prince, who extended the dominion of Argos. He is said by most ancient writers to have been the first who coined silver money.

PHERE'CRATES, a writer of the old Attic comedy, was contemporary with Plato, Aristóphanes, Phrýnichus, and Eúpolis. His play called 'The Countrymen' was represented B.C. 420. He wrote 17 comedies, of which a few fragments remain, which have been published, together with those of Eúpolis, by Runkel, Leipzig, 1829.

PHERECY'DES, the historian, was contemporary with Herodotus, and accordingly lived in the middle and latter part of the fifth century B.C. The work of Pherecýdes, which is often quoted by the Scholiasts and by Apollodórus, was a mythological history in ten or twelve books; but it also included events subsequent to the mythological period, as the Scythian invasion of Darius, and the Ionic migration led by the sons of Cadmus. The fragments of Pherecýdes have been published by Sturz.

PHI'DIAS, one of the most celebrated artists of antiquity, was a native of Athens. He seems to have been born between 490 and 480 B.C. His father's name was Charmidas. According to ancient writers, he had two masters, Hippias and Agéladas. He was extensively employed upon great public works during the administration of Cimon. Afterwards, when Pericles attained the supreme power, Phidias seems to have been consulted on all occasions in which the embellishment of the city was contemplated. Among the more remarkable objects upon which his talents were at this time exercised, the temple of Minerva, called the Par-

thenon, justly claims pre-eminence. [PARTHENON.] The architects employed upon it, under the direction and superintendence of Phidias, were Callicrates and Ictinus; but the statue of the goddess within the temple was the work of Phidias himself, and, with the exception of the statue of the Olympian Jupiter, which he made at Elis, was the most celebrated of his performances. The naked parts of the figure were made of ivory. The eyes were of precious stones. The drapery throughout was of gold—of which metal, it is said, no less than forty talents' weight was used. The people, desiring to have all the glory of this work, had a decree passed prohibiting Phidias from inscribing his name on the statue, but he contrived to introduce his own protrait (as an old bald-headed man, hurling a stone) in the representation of the combat of the Athenians and Amazons, which decorated the shield. A likeness of Pericles was also introduced in the same composition. Phidias was accused of having misapplied part of the gold entrusted to him for the statue, but the charge fell to the ground. It was then declared that the sculptor was guilty of sacrilege in having placed his own portrait on the shield of Minerva. Some accounts say he was thrown into prison, and there died by poison; others, that he was banished. It is certain that he went afterwards to Elis, and that he was employed there to execute a costly statue of the Olympian Jupiter. This statue was the most renowned of the works of Phidias. It was of colossal dimensions, and was what the ancients called *chryselephantine*, that is, inlaid with gold and ivory. It is probable that Phidias died at Elis, but the stories of his having been accused of robbery, and put to death there, are unworthy of credit.

Phidias has been called the 'sculptor of the gods.' He brought to perfection the grand or sublime style of sculpture. The artists before him are represented as having a hard, stiff, dry manner.

PHIGALIA (*Φιγαλία*), a town of Arcadia, the site of which is supposed now to be occupied by the modern town of Paulizza. From this place came the marbles in the British Museum, which are now called the Phigalian Marbles.

PHILADELPHA'CEÆ form a small natural order of exogenous plants. The species are American, European, and Asiatic shrubs of temperate climates. Many of the species, especially in the genus *Deutzia*, are clothed with beautiful stellate hairs, which form excellent opaque objects for examination with the microscope.

PHILADELPHIA, a city of Pennsylvania, in the United States of North America, in 39° 57′ N. lat., 75° 10′ W. long., 86 miles S.W. from New York, is situated between the rivers Delaware and Schuylkill, 5 miles above their junction, and 120 miles from the sea by the course of the Delaware. The city extends 4½ miles in length along the bank of the Delaware, and 2 miles in width between the two rivers. It is regularly laid out, the streets crossing each other at right angles. The highest part of the plain on which the city is situated is 64 feet above the ordinary high-water mark of the Delaware. The population in 1790 was 42,500; in 1840 it was 220,423.

The houses of Philadelphia are built with great uniformity and neatness, mostly of brick; many of them have the outer steps and window-sills of white marble. The streets are kept very clean, the common sewers conveying the dirt into the Delaware. Several of the principal streets have rows of trees on each side. There are many public squares, none of which are large, but several are finely laid out, and ornamented with trees and walks.

The public buildings of Philadelphia are numerous, and some of them very handsome. The late United States Bank is built of white marble, after the model of the Parthenon at Athens. The Bank of Pennsylvania, of white marble, has two Ionic porticoes. The United States Mint, of white marble, has also Ionic porticoes. The Merchant's Exchange, of white marble, has a Corinthian portico; it is considered one of the most beautiful structures of the United States. The Girard Bank has a white marble front, with a Corinthian portico. The United States Naval Asylum has an Ionic portico, and is surrounded by ornamental grounds. The Almshouse, on the west bank of the Schuylkill, consists of a centre and wings, with two detached buildings. Girard College, about a mile from the city, solely for the education of orphan children, has a Corinthian portico, and is entirely surrounded by Corinthian columns, 6 feet in diameter and 55 feet in height. The old State-House, erected in 1735, where the Congress sat which formed the constitution of the United States, still exists, and the room in which the members sat is carefully preserved without alteration. There are 150 places of public worship, among which 33 are Presbyterian, 22 Methodist, and 17 Baptist. There are 4 or 5 prisons. Among the places of amusement are 4 or 5 theatres. Of the numerous charitable institutions one of the most ancient is the Pennsylvanian Hospital, founded in 1750. Of the literary institutions the most important are—the University of Pennsylvania, the Jefferson Medical College, the Pennsylvanian College, the American Philosophical Society, founded in 1740, the Academy of Natural Sciences, the Franklin Institute, the Athenæum, and the Historical Society. The academies and other schools are very numerous. The Fairmount Water-works are on the east bank of the Schuylkill, two miles N.W. from the city. There are four reservoirs which occupy 30 acres, and are capable of containing 22,000,000 of gallons. A dam across the Schuylkill drives forcing pumps, which raise the water into the reservoir, and the water is distributed in pipes throughout the city. A bridge and a railway viaduct cross the Schuylkill. The city is governed by a mayor, a select council of 12 members, and a common council of 20 members.

The largest ships come up the Delaware to the city, which is there nearly a mile wide. The Schuylkill is also navigable for smaller vessels to the bridge. Numerous steam-vessels communicate

regularly with New York and Baltimore; railroads in various directions make Philadelphia a great thoroughfare; and by the Philadelphia Canal it communicates with Pittsburg and the great valley of the Mississippi. The two rivers are frozen over for some time in the winter.

Besides its large commerce, Philadelphia has numerous manufactories, and an extensive inland trade.

Philadelphia was founded by William Penn in 1682. On Sept. 5, 1774, the members of the first Congress assembled at Philadelphia, where they adopted the 'Declaration of Rights,' which may be regarded as the preface to the 'Declaration of Independence,' which was proclaimed at Philadelphia in April, 1776. Philadelphia was the seat of the federal government till the year 1800, and the capital of Pennsylvania till 1799.

PHILADELPHIA. [LYDIA.]

PHILADELPHUS, a genus of plants of the natural family of *Philadelphaceæ*. The greatest number of species are indigenous in North America; whence they have been introduced into the shrubberies of this country, to which they form a highly-ornamental addition. The best known species is *P. coronarius*, commonly called Syringa, which is very easy of culture, and found in most gardens. It is supposed to be a native of the south of Europe, but it has hardly ever been found in a wild state, and even in those few cases it may have escaped from cultivation.

PHILE'MON, a writer of the New Comedy, was born at Soli in Cilicia, according to Strabo, or at Syracuse, according to Suidas. Philemon began to exhibit comedies a little earlier than Menander, and before 328 B.C. He lived to the age of ninety-six or ninety-seven (Lucian, 'Macrob.,' 25), and died in the reign of the second Antigonus, son of Demetrius; he must consequently have been alive subsequent to B.C. 283. He is said to have written 97 comedies, of which only fragments exist, which are generally published with those of Menander. The best edition is by Meineke, Berlin, 1823. Philemon was the rival of Menander. [MENANDER.]

PHILE'MON, EPISTLE TO. Philemon was a man of distinction, if not a presbyter, of the church at Colossæ, and was probably converted from heathenism by St. Paul. He had a slave named Onésimus, who robbed his master and fled to Rome, where he met with St. Paul, a prisoner there, about A.D. 62, and through him he became reformed. St. Paul then wrote the 'Epistle to Philemon,' and sent it to Colossæ by Onesimus.

PHILIDOR, ANDRÉ, a French dramatic composer of eminence in his day, but better known out of his own country as a chess-player, was born at Dreux in 1726. His grandfather was musician to Louis XIII.: his father held the same office, and his uncle established, in 1726, the famous 'Concert Spirituel.' André was admitted as a page, or chorister, in the chapel of Louis XV., and studied under Campra, Maître de la Chapelle. In 1737, when he had only completed his eleventh year, he produced a motet for a full choir, for which the king deigned to thank him. He tried his strength as a composer in London in 1753, by setting Congreve's 'Ode to Harmony.' Chess however had occupied more of his thoughts than his avowed profession, and he had previously, in 1749, published his 'Analysis of the Game of Chess,' for which he obtained a large list of subscribers. In 1754 he returned to Paris, and devoted himself wholly to his profession.

In 1779 he produced at Free-Masons' Hall, London, the 'Carmen Seculare' of Horace, set to music, consisting of airs, choruses, &c. He afterwards passed much of his time in London, chiefly occupied by the game of chess, which he played at a club-house in St. James's Street. It was there he exhibited his extraordinary powers, by playing three games, against different adversaries at different boards, all at the same time. And only two months before his decease, which took place in London, in 1795, he played two games, blindfolded, simultaneously, against very expert players, and was victorious.

PHILI'NUS, a Greek physician, born in the island of Cos, was one of the pupils of Herophilus, and the founder of the sect of the Empirici. He lived somewhere about the year B.C. 250, and wrote a work on botany.

PHILIP, the name of several kings of Macedonia, of whom two deserve particular notice.

PHILIP, a younger son of Amyntas, succeeded (B.C. 359) at the age of 23 years to a throne which, since the death of his father, and during the reigns of his two elder brothers, Alexander and Perdiccas, had been shaken by foreign invasion and civil war. But the young king was endowed with talent and energy; and a residence during his boyhood at Thebes, whither he had been sent as a hostage, while Pelopidas and Epaminondas were in power, had given him great advantages. On his accession to the throne his kingdom was overrun by the *Illyrians*, who had defeated and slain his brother Perdiccas; his own title was disputed by two pretenders. But he soon induced the adherents of his rivals to abandon their cause; and he not only repelled the Illyrians and Pæonians, but invaded their territories. He further strengthened himself by a marriage with Olympias, daughter of the king of Epirus, who became the mother of Alexander the Great, but was afterwards divorced for her ungovernable temper.

From the period of the full establishment of his authority, Philip seems to have commenced the design, which he steadily pursued and accomplished, of destroying the power and influence of the Athenian people on the northern shores of the Ægean Sea. After the general peace which followed the battle of Mantineia (B.C. 362), Athens again became the most prominent state in Greece, and many of the islands of the Ægean were again in the relation of subject allies to her. But the oppression of Athens again broke the bond of union, and produced (B.C. 358) the Confederate or Social War. Philip took advantage of this opportunity to gain possession of Amphipolis, Potidæa, and other towns on the north coast of the Ægean. He also got possession of the gold mines near Pangæus in Thrace, near which he built or

enlarged a city called, after his name, Philippi. These mines were very productive, and furnished the gold with which the Macedonian king coined his 'Philips,' and supplied himself with arms which he knew how to use. The first occasion for interfering in the domestic politics of the Greeks was afforded to Philip by the Phocian or Sacred War, which commenced before the close of the contest between Athens and her allies. The real cause of the persecution of the Phocians was the hatred with which that people had inspired the Thebans by refusing to join them in the late war against Sparta. Availing themselves of their influence in the Amphictyonic Council, the Thebans accused the Phocians of having cultivated lands which had been devoted to the Delphic god. The Phocians were found guilty by the Amphictyons, and condemned to pay a fine so enormous, that for its liquidation their whole country was declared forfeit to the god. The Phocians anticipated their enemies by seizing upon Delphi (B.C. 357), and, supported by Athens and Sparta, they commenced a sanguinary war against the Thebans and their allies.

During the progress of this struggle, Philip gained a footing in Thessaly; but this brought him into opposition to the Athenians, and soon after he captured Methóne; and in B.C. 347 he took Olynthus, notwithstanding the aid which the Athenians sent to that city. In the following year a treaty was concluded between Philip and the Athenians, from which the Phocian allies of Athens were excluded, either because Philip outwitted the Athenian ambassadors who were sent to him, or bribed them. The Thebans now applied to Philip for aid against the Phocians, and the Macedonian king having passed the defiles of Thermopylæ, soon brought the Phocian war to an end. The Phocians were now compelled to surrender unconditionally; the Amphictyons decreed that their towns should be destroyed, and the inhabitants disarmed and heavily fined; and their privileges at Delphi and votes in the Amphictyonic Council were transferred to Philip. Thus ended (B.C. 346) the Sacred War.

After the Phocian war Philip turned his arms against the cities of the Propontis and the Thracian Chersonesus; but as soon as he attacked Perinthus and Byzantium, Demosthenes urged the Athenians to send an armament, which, under the command of Phocion, compelled him to raise the siege of those cities (B.C. 339). But the triumph of the great orator and the disappointment of the ambitious prince were alike momentary; and the event soon proved how unequal was the conflict between the desultory impulse which could be given to a fickle and divided democracy, and the concentrated power of a monarch of high talent and immense resources. In the very next year after his repulse before Byzantium, Philip found a pretext for appearing again in arms in Greece itself. He was appointed by the obsequious Amphictyonic Council their general in a new Sacred War which they had denounced against the people of Amphissa; and after reducing that city, he seized Elateia, the key of Bœotia, at the head of 32,000 veteran troops. The Athenians were filled with dismay; but the eloquence and activity of Demosthenes animated them to extraordinary exertions, and induced the Thebans, Corinthians, and others, to join with Athens in the cause of independence. The numerical superiority of the confederates however, though they fought with great bravery, could not prevail against generalship and discipline; and in the fatal battle of Chæroneia (B.C. 338) the confederates were totally defeated.

Philip treated the party that had been hostile to him at Thebes with great severity; and he imposed a Macedonian garrison upon the subjugated city. To the Athenians, on the contrary, he behaved with the greatest clemency, and he granted them peace upon very easy terms, the principal condition being that they should send deputies to a general congress of the Amphictyonic states at Corinth. In this meeting it was mooted that the Greeks should undertake a war against the Persian Empire, and that the Macedonian king should be appointed commander-in-chief, with power to apportion the contingent of each Grecian state. But while he was making preparations for the expedition which his son was destined to accomplish, his days were cut short. While celebrating the nuptials of his daughter Cleopatra with the king of Epirus, he was stabbed by a young Macedonian of his own bodyguard, Pausanias, whose motive for the deed, as he was himself put to death on the spot, could not be ascertained, but has been most probably ascribed to personal revenge, on the king's refusal to grant him redress for an intolerable insult which he had received from the queen's uncle.

Thus fell Philip (B.C. 336), at the age of 47 years, and in the full vigour of life and intellect, at the moment when he seemed to be entering on a career of glory. The king of Macedonia was a man of great talents, and a wise and popular administrator in his own kingdom. He was not cruel; and he showed himself on many occasions generous and forgiving. He was also a man of taste, of a refined and cultivated understanding. He was ambitious, and unscrupulous in all his schemes for the aggrandisement of his kingdom; and his personal habits were those of a debauchee and a profligate. He is charged especially with drunkenness; but it is probable, if we may judge from the rest of his character, his activity, and his success, that he was rather guilty of occasional excess than addicted to habits of intemperance.

PHILIP, the only other of the Macedonian kings of that name whose life and reign merit some attention, ascended the throne (B.C. 220) at an early age, on the death of his uncle Antigonus Doson. He was the grandson of Antigonus Gonnatas, and therefore lineally descended from the first Antigonus, one of the generals of Alexander the Great. Philip was a man of ability. At the beginning of his reign he joined the Achæans against the Ætolians, and became the head of the Achæan Confederation. His successful generalship soon disposed the Ætolians to peace, which Philip granted in order to have time to turn his attention to Italy, where the Romans were engaged in their contest with Hannibal. After the battle of Cannæ (B.C. 216), he formed an

alliance with Hannibal, but he gave him no effectual assistance. When the Romans began to get the advantage over Hannibal, they determined to punish Philip, and at last they declared war against him. He was defeated, B.C. 197, at Cynoscéphalæ in Thessaly, by the Roman consul T. Quintius Flamininus, and he obtained peace on tolerable terms. He died B.C. 179, and was succeeded by his son Perseus, who lost his crown in his contest with the Romans.

PHILIP, ST., was the first disciple of Jesus Christ, and one of the apostles. He was a native of Bethsaida, a town near the sea of Tiberias. He has been erroneously confounded with Philip the Deacon. Philip suffered martyrdom in Hierapolis, but in what year is not stated.

PHILIP I., king of Castile, surnamed the Handsome, was the son of Maximilian I., emperor of Germany, by Mary of Burgundy, in right of whom he inherited and transmitted to his posterity of the house of Austria, the 17 provinces of the Netherlands. In 1496 he married Joanna, eldest daughter of Ferdinand the Catholic and Isabella, sovereigns of Aragon and Castile; and in 1504, on the death of Isabella, who bequeathed the kingdom of Castile to her daughter, Philip, as well as his consort, assumed the regal title. He was crowned at Burgos with her; and in consequence of her mental weakness, exercised all the functions of government during the short remainder of his life, which closed in the following year, at the early age of 28.

PHILIP, Kings of Spain. [SPAIN.]

PHILIPPE OF ORLEANS. [ORLEANS, HOUSE OF.]

PHILIPPE I., PHILIPPE II. of FRANCE. [FRANCE.]

PHILIPPE III., surnamed *le Hardi*, was the eldest son of Louis IX., and was born in 1245. He was proclaimed king in the camp before Tunis, which city his father was besieging at the time of his death, Aug. 1270. He reduced the power of the nobles, but was not so successful in his foreign policy. He died in 1285.

PHILIPPE IV., better known as *Philippe le Bel*, son of Philippe le Hardi, by his first wife, Isabella of Aragon, was born 1268; and succeeded his father on the throne of France, Oct. 1285, having previously acquired, in right of his wife Jeanne, the crown of Navarre. The young king gave, from the first, his confidence to the lawyers, who were gradually working the overthrow of the feudal system. In this as well as in his rapacious exactions, his policy nearly resembled that pursued at a later period by our own Henry VII. like whom his chief objects were to amass wealth and depress the power of the nobility.

It was in the reign of Philippe le Bel that the *Tiers Etat*, or Commons, were admitted for the first time to take part in the national assemblies subsequently designated *les Etats Généraux*, or *States-General*. Philippe died in Nov. 1314.

PHILIPPE V., known as *Philippe le Long*, the second son of Philippe IV., was born 1294. His elder brother, Louis X., or Louis le Hutin, died June 5, 1316, leaving by his first wife a daughter, who succeeded him on the throne of Navarre, and his queen, who was his second wife, pregnant. It was arranged that if she produced a son, Philippe was to retain the government as regent during the minority of the child; if a daughter, he was to be recognised as king. The child, which was a boy, died a few days after birth (Nov. 1316), and Philippe assumed the sovereignty in full right.

It was upon this occasion that the Salic law, by which females were excluded from the succession to the throne, was established as a constitutional law in France. During this reign the finances were regulated, and many abuses reformed by the States-General. Philippe died Jan. 3, 1322.

PHILIPPE VI., usually called *Philippe de Valois*, was son of Charles, Count of Valois, a younger son of Philippe III. He succeeded Charles le Bel in 1328. During this reign the war between Edward III. and Philippe broke out, 1337. The former assumed the title of king of France, and, after gaining other advantages, defeated the French king at Crécy (1346). Philippe also lost Calais (1347), and was unsuccessful on the side of Guienne and Poitou (1345, 1347). A dreadful pestilence, which swept away a third part of his subjects (1348), filled up the measure of his adversity. He died Aug. 22, 1350. During the reign of Philippe VI. the contest for the duchy of Bretagne commenced between Charles de Blois and Jean de Montfort, the former being supported by Philippe VI. and the latter by Edward III. of England. The dispute was terminated by the death of Charles de Blois in 1364 at the battle of Auray, and by the treaty of Guerande in 1365, which secured the duchy of Bretagne to the house of Montfort.

PHILIPPEVILLE. [ALGIERS.]

PHILIPPI. [MACEDONIA.]

PHILIPPIANS, EPISTLE TO THE, is one of the epistles written by St. Paul during his first imprisonment at Rome. [PAUL, ST.]

PHILIPPINES, the most northern group of islands of the Indian Archipelago. They lie between 5° and 20° N. lat., 120° and 127° E. long. The Strait of Balingtang, or Great Passage, separates them from the Batanes and Bashee Islands, which lie farther north. On the E. extends the Pacific, and on the S. the Celebes Sea. Numerous chains of small islands connect the Philippines with other groups in the Pacific.

The Philippines consist of ten larger and a great number of smaller islands. The larger islands have altogether an area of more than 120,000 square miles, and the smaller an area of about 6000 square miles.

1. *Luzon*, which is by far the largest of these islands, has an area of 57,405 square miles. The form of the island, which is extremely irregular, may be compared to a bent arm. Its length, measured along the bend, is more than 550 miles. The width varies between 10 and 136 miles. Where the bend occurs, which is near 14° N. lat., a deep bay enters the land from the north, and divides the island into two peninsulas. The isthmus which connects the two peninsulas is only from 10 to 12 miles wide, and nearly 50 miles long. The rocky coast of the island has many bays of

various sizes. That portion of the island which lies north of 16° N. lat. seems to consist of one extensive mass of rocky mountains which in many places come close to the shore of the sea, and in others are divided from it only by a narrow strip of low and frequently sandy ground. Some of the harbours and bays in this part of the island are very fine. The Bahia de Manila is one of the finest basins in the world. The peninsula generally contains only a few Spanish settlements, and has but little fertile land.

The peninsula of Camarines, or the south-eastern part of the island of Luzon, is connected with the north-western part by a low isthmus; indeed it is supposed that a natural water communication once existed across the isthmus, from the Bay of Seno de Lamon on one side to Seno de Ragay on the other. The peninsula of Camarines is chiefly occupied by a mass of high mountains, which come close to the southern shores, and only in a few places leave a narrow strip of level ground. There are several volcanic mountains. There is a considerable number of agricultural settlements on this volcanic tract, especially in the country surrounding the Bahia de San Miguel.

2. *Mindoro* is 100 miles long, and rather more than 40 miles wide on an average. The mountains which occupy the interior rise to a very great elevation; but they descend in gentle slopes, and the sea-shore is skirted by low hills, which are covered with forests of lofty trees. There is only a small number of Malay families settled on some points of the coast.

3. *Panay* has the form of an isosceles triangle, the base of which is more than 100 miles long, and the other sides more than 80 miles. Along the western coast the country is of moderate elevation, well cultivated, and populous.

4. *Negros* is about 140 miles long, with an average width of about 25 miles. It seems to be very mountainous, and contains a comparatively small number of agricultural settlements.

5. *Zebú*, or *Cebú*, extends in length from S. to N. rather more than 100 miles, but it is hardly more than 20 miles wide on an average. It contains a good proportion of fertile land, and is populous.

6. *Bohol* is the smallest of the larger Philippines except Masbate. It extends in length from W. to E. about 45 miles, with an average width of 30 miles, and is rather thickly inhabited.

7. *Leyte*, or *Leite*, extends from S. to N. about 120 miles, with an average width of 35 miles.

8. *Sumar*, or *Ybabas*, has the form of a triangle whose apex is turned to the south: the base measures about 60 miles, and the perpendicular length about 115 miles. A great part of this island, especially towards the north, is covered with high mountains, which are visible from a great distance at sea.

9. *Masbate* has a triangular form, whose apex is to the east. The base, or western coast, is nearly 40 miles long, and the perpendicular length about 55 miles. This island appears to be a mass of high rocks, and to contain very little cultivable ground.

10. The island of *Magindanao*, or *Magindano*, is the most southern of the Philippines, and the largest next to Luzon. Its form is extremely irregular; but the coast-line considerably exceeds 1000 miles. The island is nearly cut in two by the Bays of Illano and Panguyl. Near the isthmus which separates the bays is the large Lake of Lano. The island contains many lofty hills, among which the Palangy and other rivers take their rise. A few volcanoes have been met with. The island is politically divided into three parts. The Spaniards have formed a great number of settlements on the eastern and western coast, where the inhabitants consist almost exclusively of Bisayes, or Malays of the Philippines. The large peninsula which extends between the Bay of Illano on the west and the Pacific on the east acknowledges the authority of the Sultan of Magindanao, whose subjects are mostly Malays, and inhabit the country along the coast; but the interior is occupied by the Haraforas, who are treated by the Malays not as subjects, but as slaves.

Climate and Productions.—The climate of the Philippines is altogether of a tropical character; it has a rainy and a dry season, and is subject to hurricanes and earthquakes. The staple articles for the European market are sugar, indigo, rum, and tobacco; and for the Chinese market, sapan-wood, rice, edible birds' nests, and trepang. A small quantity of coffee, ebony, sulphur, cotton, pearls, mother-of-pearl shells, tortoise shells, and cordage, are also exported. Cordage is made from the fibres of a species of banana. The principal food of the inhabitants consists of rice and fish. They also cultivate millet, and several kinds of beans and other pulse. The fruit-trees include the cocoa-nut, bread-fruit, mango, orange, fig, areca-nut, and plantain.

The buffalo is universally used in all field-labour, though in some parts the people have begun to substitute the bullock for it. The islands also contain cattle, horses, sheep, goats, pigs, domestic fowls, deer, wild hogs, wild bees, and a plentiful supply of wild fowl.

Gold, iron, and copper, are said to exist in Luzon and Magindanao, but at present none of these metals are worked. Salt and brimstone are procured in several places.

Inhabitants.—When the Spaniards took possession of the Philippines, they found the islands occupied by two different races of men; the Malays, or Indios, and the Negritos, or Aetas. The Negritos were probably the aborigines of the islands, and had retired to the mountains when the Malays began to occupy the lower country, being of a diminutive size, and unable to offer resistance: in the mountains they had maintained their independence. The Negritos are, in some of the islands, agriculturists, but in others, savages. The Malays are divided into a great number of tribes, of which that called Tagala occupies the neighbourhood of Manila and the country round the Laguna de Bay, in Luzon. They are all subject to the Spaniards. They are proprietors of the soil and free subjects, and are treated by the Spaniards as such. The forts, which are built in

many places along the coast to oppose the pirates, are in their power, and are garrisoned by them.

Divisions and Towns.—The Philippines, as far as they are subject to Spain, are divided into twenty-nine provinces, of which seventeen are situated in the island of Luzon, and twelve in the smaller islands, and on the northern and eastern coast of Magindanao. The population, in 1818, amounted, according to the census, to 2,214,142 individuals; and in 1837, according to an estimate founded on the number of families paying the capitation tax, to 3,202,760. Two-thirds of the whole number inhabit Luzon.

Manila, the capital and seat of the captain-general or governor of the island, is built on the eastern shores of the Bahia de Manila, at the mouth of the River Pasig. It consists of two towns with extensive suburbs. The city, Manila, is built on the southern banks of the Pasig, and inclosed by high walls and a ditch which is connected with the river. The streets are straight, wide, and well paved. The houses are built of stone, and are substantial. There are several well-built churches and convents. The palace of the captain-general is not distinguished by its architecture, but the custom-house, or *aduana*, is a large and fine building. The city is only inhabited by Spanish families. Close to it on the south are the suburbs of Hermita and Malate, which are more populous than the city. There are near Manila, and on the shores of the bay, the large suburbs or towns of Bidondo, Tondo, and several others. If Manila is considered to include all these portions, it will comprise about 120,000 inhabitants. In the large square of the city stands the statue of Charles IV. of Spain, of bronze, somewhat larger than life. Manila contains a royal college for the instruction of youth, a university which was founded by Philip IV. in 1645, a nautical academy, an hospital for the poor, and various other religious and charitable establishments.

Cavite, which lies S. of Manila, is a well-built fortress, situated at the extremity of a tongue of land about two miles long: it protects the Ensenada de la Estanzuela, the only harbour in the Bahia de Manila. The arsenal is in that fortress, and vessels are built there. The other towns of the Philippines are little known.

Manufactures and Commerce.—The Malays use very few manufactured goods exported from other countries, and they have applied themselves to some branches of manufacture with success, including earthenware, cotton stuffs, straw and chip hats, mats, and especially cigars and cheroots.

The commerce of the Philippines was formerly limited to the mother country and the Spanish colonies in America. The most important and lucrative branch was the commerce with Mexico, which was conducted by means of galleons that sailed once a year between Acapulco and Manila. They chiefly carried to America silk manufactures and other goods obtained from the Chinese, and brought in return the produce of the Mexican silver-mines. But since the Spanish colonies in America have obtained their independence, the port of Manila has been thrown open to all commercial nations, and the increase of the exports has been very rapid. Manila now carries on commerce with a great number of nations. The value of British merchandise exported to the Philippines from 1836 to 1846 averaged about 100,000*l.* annually.

History.—The Philippines were discovered by Fernando Magalhaens in 1521, who was killed in one of the islands. In 1564 the Spaniards made a settlement in one of the islands, and founded Manila in 1571. The Spaniards obtained the possession of this important group of islands almost without bloodshed, and they have preserved it by converting the inhabitants to Christianity, in which they have been perfectly successful, as the Islam at the time of the conquest had not extended farther than to the Moluccas. The Spaniards have retained the islands ever since, except from 1762 to 1764, during which the English held Manila. The Philippines, together with the Marianas, are administered by a governor who has extensive powers. The islands are divided into provinces, at the head of which is a governor, or alcalde mayor; and the provinces are subdivided into pueblos, which have also their petty governor, and officers subordinate to him.

PHILIPPINES, NEW (more properly called *The Carolines*), are a group of islands lying between New Guinea and the Ladrones, and stretching from 5° to 13° N. lat., and from 138° to 164° E. long. The islands in this tract of the Pacific are very numerous. Most of them are small, and lie within coral reefs; the produce of these is mostly limited to cocoa-nuts and bread-fruit. Such of the islands as are isolated are in general high towards the shore, some of them rising to an elevation of 1200 feet above the sea; but like the smaller islands they slope away towards the centre, each presenting a narrow strip of land encircling a lagune. The high lands of the isolated islands abound with forest trees, amongst which the cabbage-tree is common. Plantains and arums are cultivated; from the root of the latter the inhabitants, who are of Malay origin, make flour. They also cultivate the sugar-cane, cocoa, bread-fruit, and the banyan-tree. The areca-palm grows in the islands. The natives make excellent mats, and large canoes, in which they fish with great industry, and undertake long voyages in their trading excursions to the Spaniards of the Ladrones. The islands are said to be governed by kings or chiefs, but very little is known about them.

PHILIPPUS was the name assumed by the impostor Andriscus, who, by pretending to be the son of King Perseus, induced the Macedonians to acknowledge him as their king. He was driven out of Macedonia by Q. Cæcilius Metellus, and given up to the Romans by a Thracian prince with whom he had taken refuge.

PHILIPPUS, M. JULIUS, a native of Bostra in Trachonitis, was promoted by the later Gordianus to the command of the imperial guards after the death of Misitheus, A.D. 243. In the following year he accompanied Gordianus in his expedition into Persia, when he excited a mutiny among the soldiers, who compelled Gordianus to acknowledge Philippus as his colleague. A short

time afterwards Philippus caused Gordianus to be murdered, and the senate acknowledged him emperor. Having made peace with the Persians, Philippus led the army back to Syria, and thence went to Rome. In A.D. 248 Philippus celebrated the thousandth anniversary of Rome with great splendour. A revolt having broken out among the legions on the Danube, Philippus sent Decius to take the command of them, but on his arrival Decius was proclaimed emperor by the soldiers. Philippus marched against his rival, whom he met at Verona. Philippus was defeated, and lost his life, and the prætorian soldiers killed his son of the same name, and Decius was acknowledged emperor B.C. 249.

PHILIPS, AMBROSE, was born about 1671, and is said to have been descended from an old Leicestershire family. He was educated at St. John's College, Cambridge, and his first printed performance is a copy of English verses in the Collection published by that university in 1695. From this date nothing is known of him till the appearance of his six Pastorals, which, Johnson observes, he must have published before the year 1708, because they are evidently prior to those of Pope. Philips's next performance was his 'Letter from Copenhagen' (in verse) to the Earl (afterwards Duke) of Dorset, dated March 9, 1709, which was printed in the 12th No. of the 'Tatler' (May 7, 1709), with an introductory eulogium by Steele. He afterwards translated the 'Persian Tales' from the French for Tonson, and brought out an abridgment of Hacket's 'Life of Archbishop Williams.' The next event of his literary life was the production at Drury Lane, in Feb. 1712, of his tragedy of the 'Distressed Mother,' which, although little more than a translation of the 'Andromaque' of Racine, was received with great applause, and long continued to keep possession of the stage. A short time before, Philips's translation of 'Sappho's Hymn to Venus' had been printed in the 'Spectator,' No. 223. But Pope and others contrived to bring him into ridicule, and the public were taught to call his poetry 'Namby-pamby,' a name first bestowed, we believe, by Henry Carey, the clever author of 'Sally in our Alley' and 'Chrononhotonthologos.' If the muses failed him however, Philips was consoled by considerable success as a politician. Soon after the accession of the House of Hanover, which fixed his Whig friends in power, he was made a commissioner of the lottery and one of the justices of the peace for Westminster. In 1721 he produced two more tragedies, 'The Briton,' and 'Humphrey, Duke of Gloucester,' both now forgotten. He next engaged in a periodical paper called 'The Freethinker,' in which one of his associates was Dr. Boulter, who was afterwards made bishop of Bristol and then archbishop of Armagh, and who, when he went over to Ireland, took Philips with him, and provided so well for him as to enable him to represent the county of Armagh in the Irish parliament. He at last rose to be judge of the Prerogative Court in Ireland; but resigned that place in 1748, and returned to his native country, where he died of apoplexy, June 8, 1749.

PHILIPS, JOHN, was the son of Dr. Stephen Philips, archdeacon of Salop, and rector of Bampton in Oxfordshire, at which latter place he was born, in 1676. Having received his school education at Winchester, he was entered at Christ Church, Oxford, in 1694. He first became known by his poem entitled 'The Splendid Shilling,' which appeared in 1703. In 1705 Philips produced his next poem, entitled 'Blenheim,' which however found comparatively few admirers in that day, and has been generally forgotten since. Philip's chief work, his 'Cider,' a poem in two books, was published in 1706: like everything else that he wrote, it is in blank verse, and an echo of the numbers of 'Paradise Lost.' A complication of consumption and asthma put a period to his life, Feb. 15, 1708.

PHILISTINES. [PALESTINE.]

PHILISTUS a native of Syracuse, was very intimate with the elder Dionysius, whom he assisted in obtaining the supreme power, B.C. 406; but having displeased the tyrant, he was banished from Syracuse. He retired to a city on the Adriatic Gulf, and did not return to Syracuse till the accession of the younger Dionysius. When Syracuse was taken by Dion, B.C. 356, Philistus passed over into Italy, and procured from Rhegium alone 500 horse. After making an unsuccessful attempt upon Leontini, which had declared in favour of Dion, he joined Dionysius in the citadel, and was shortly after killed in a naval engagement, or, according to other accounts, was taken prisoner and put to death. Philistus must have lived to a considerable age, as he was an eye-witness of the Athenian defeat at Syracuse, B.C. 415, fifty-nine years before his death. He wrote a history of Sicily, which Cicero commends highly.

PHILLIPS, THOMAS, R.A., was born at Dudley, in Warwickshire, Oct. 18, 1770. He was placed very early with Mr. Edgington at Birmingham to learn to paint on glass; and he came to London in 1790 with a letter to West, who employed him at Windsor on the glass paintings in St. George's Chapel. He afterwards painted some historical pieces, which were exhibited; but his portraits gained him his reputation. Among his sitters were many of the most distinguished persons of the time. In 1808 he was made a member of the Royal Academy. In 1824 he succeeded Fuseli in the professorship of painting, and in the same year made a tour in Italy, in order the better to qualify himself for the discharge of his office, which he held until 1832; and he delivered in all ten lectures, which he published together in one volume 8vo. in 1833, under the title 'Lectures on the History and Principles of Painting.' He died April 20, 1845.

PHILLIPSITE, a grayish translucent mineral, the primary form of which is a right rhombic prism. It consists chiefly of silica and alumina.

PHILLY'REA, a genus of Mediterranean evergreen shrubs, many varieties of which are cultivated in our gardens. They are much like the evergreen shrubs called Alaternus. The hardiest and handsomest variety is *P. obliqua;* the most tender and the least beautiful is *P. angustifolia.*

PHILO JUDÆUS, that is, Philo the Jew, was a native of Alexandria. He represents himself as of advanced age about A.D. 40, when he was sent as chief of an embassy from the Jews of Alexandria to the Emperor Caligula, for the purpose of pleading their cause against Apion, who charged them with refusing to pay due honours to Cæsar. He went again to Rome in the reign of Claudius, and after this nothing is known about him. Philo was a learned Jew, and well acquainted with the philosophy of the Greeks, and he was also well acquainted with the Greek language, in which he wrote. The two best editions of his works are by Mangey, London, 1742, 2 vols. folio; Richter, Leipzig, 8 vols. 8vo., 1828–1830.

PHILO'LOGY. It is difficult to attach a precise meaning to this word, as it is used in different significations by different writers. Among the Greeks and Romans, the term philology was originally used to signify a love for the investigation of all subjects connected with literature. The Alexandrine critics applied the term philólogus to a person who was well acquainted with the ancient Greek writers and with the subjects treated of in their works; and we learn from Suetonius ('De Illust. Grammat.' c. 10), that Eratosthenes, who lived in the second century before the Christian æra, was the first who obtained this name, in consequence of his extensive and varied learning. In later times, a philólogus was merely a person skilled in language, and the word became almost synonymous with grammaticus.

Some modern writers have included under the term philology the study of Greek and Roman antiquities, but the majority of writers appear to regard the study of the theory of language and of languages in general as the only subjects strictly belonging to philology.

The reader who wishes further information respecting the different meanings attached to the word philology, may consult Ast's 'Grundriss der Philologie,' Landshut, 1808, and the first essay in Wolf and Buttmann's 'Museum der Alterthums-Wissenschaft,' Berlin, 1807.

PHILOMELA. [NIGHTINGALE.]

PHILOPŒMEN, the son of Craugis or Crausis of Megalópolis in Arcadia, was born about 253 B.C. He studied philosophy and the art of war, and also devoted himself to agriculture. Philopœmen was thirty years of age, when Cleómenes III., king of Sparta, surprised Megalopolis by night, and he was one of the last to leave the town. He was present at the battle of Sellasia, B.C. 222, in which Cleomenes was defeated. After this battle he served as a volunteer in Crete, and on the death of Arátus, B.C. 213, he returned home, and was made general of the Achæan cavalry. He improved the discipline of this force, and recruited its strength; and he improved generally the tactics and discipline of the Achæan army. In a war between the Achæans and Machánidas, tyrant of Sparta, Philopœmen defeated Machanidas near Mantineia, and killed him with his own hand. In B.C. 201 Philopœmen was made stratégos, or captain-general, of the Achæan league, of which from that time to his death he was the principal leader. He drove out of Messenia, Nabis, the successor of Machanidas, and restored the Messenians to their position as independent allies of the Achæans. As there was now nothing to do at home, he made a second campaign in Crete. On his return home (about 197 B.C.) he found the Romans victorious over Philip of Macedonia, the Achæans in alliance with Rome, and Nabis the enemy of both. Nabis was murdered B.C. 192, and Philopœmen compelled Sparta to join the Achæan league.

A quarrel between Sparta and the Achæans led to the invasion of Laconica by Philopœmen (B.C. 189). Again, in B.C. 188, he invaded Laconica, compelled the Spartans to raze their walls, to allow the return of the emigrants who had been exiled by Nabis, and to abolish the institutions of Lycurgus, which had existed for seven centuries. The Romans were appealed to both by the Spartans and the Achæans, and the Roman senate sent Appius Claudius and others as commissioners to the Peloponnesus. In a congress of the Achæans, Appius declared that the Romans were displeased with the treatment of Sparta. Lycortas, the father of the historian Polybius, replied in defence of the Achæans in an eloquent speech. (Liv. xxx. ix. 36.) The congress of the Achæans refused to reverse their decree, and left the Roman senate to do as they liked, whereupon the senate allowed Sparta to continue a member of the Achæan league, on the condition of a general amnesty, and the restoration of all political exiles. In B.C. 183 Philopœmen, then seventy years of age, was elected stratégos of the Achæans for the eighth time. Messéne having withdrawn from alliance with the Achæans, Philopœmen went against it with a body of cavalry, but he was taken captive by the Messenians, and thrown into a dark prison, where the executioner was ordered to present to him a cup of poison. Philopœmen asked the man whether he knew what had become of the Achæan cavalry, and especially of his friend Lycortas? The man answered that they had retired in safety. 'Then we are not altogether unhappy,' observed the aged general, and he took the cup, and drank the poison, which soon put an end to his life (182 B.C.). The news spread rapidly through Achæa. Lycortas, being appointed stratégos, marched to avenge the death of his friend. The Messenians opened their gates, and the remains of Philopœmen being burned, the ashes were collected in an urn, which was carried by young Polybius in solemn procession of the Achæan army to Megalopolis. The Messenian prisoners who had been concerned in the death of Philopœmen were stoned to death. Statutes to his honour were set up in most Grecian cities. Philopœmen has been styled by some the last of the Greeks: he was certainly the last of their successful commanders.

(Plutarch, *Philopœmen;* Polybius, xxiii.; *Fragments*, xxiv. 5; Livy, xxxix.)

PHILOSOPHER'S STONE. [ALCHEMY.]

PHILOSOPHY, from the Greek *philosophia*, (φιλοσοφία), literally signifies 'love of wisdom or knowledge,' and a philosopher (φιλόσοφος) is a 'lover of wisdom.' Pythagoras (Diog. Laert., 'Procem.') is said to have first used the term

philosophy, and to have called himself a philosopher, instead of a sophus (σόφος), or 'wise man,' for, he added, no one is wise but God.

The terms philosophy, philosophical, philosopher, are often used in our own language apparently with no great precision, though it is not difficult to deduce from the use of these terms the general meaning or notion which is attached to them. We speak of the philosophy of the human mind as being of all philosophies that to which the name philosophy is particularly appropriated; and when the term philosophy is used absolutely, this seems to be the philosophy that is spoken of. Other philosophies are referred to their several objects by qualifying terms: thus we speak of natural philosophy, meaning thereby the philosophy of nature, that is, as the term nature is generally understood, of material objects. We also speak of the philosophy of positive law, understanding thereby the philosophy of those binding rules, properly called laws. The terms philosophy of history, philosophy of manufactures, and other such terms, are also used. All objects then which can occupy the mind may have something in common, called their philosophy; which philosophy is nothing else than the general expression for that effort of the mind whereby it strives, pursuant to its laws, to reduce its knowledge to the form of ultimate truths or principles, and to determine the immutable relations which exist between things as it conceives them. The philosophy which labours to determine the laws or ultimate principles in obedience to which the mind itself operates is commonly termed metaphysics. Thus every kind of knowledge, the objects of which are things external, has its philosophy or principles, which, when discovered and systematised, form the science of the things to which they severally belong.

PHILO'STRATUS, FLAVIUS, a native of Lemnos, born in the second half of the second century of our æra, taught rhetoric first at Athens and afterwards at Rome, where he was patronised by the Empress Julia, the wife of Septimius Severus, who was partial to the learned. She commissioned him to compile the biography of Apollónius of Tyana from some memoirs written by a certain Damis of Nineveh, who had accompanied Philostratus in his peregrinations, and which had come into her possession. Philostratus professes also to have used in his compilation a collection of letters of Apollonius, which were at one time in the possession of Hadrian, together with certain responses of the Oracle of Trophónius, which Apollonius had also collected. The book of Philostratus displays great credulity, either real or affected, in the compiler, and a great want of critical discrimination. Philostratus wrote also the Lives of the Sophists; Heroica; Icones, or descriptions of sixty-four paintings, which were in a portico near Neápolis; and Epistles. His nephew, the young Philostratus, also wrote Icones, which are not descriptions of paintings, but subjects proposed to painters. All the works of the two Philostrati were published by Olearius, folio, Leipzig, 1709.

PHILO'XENUS, a native of Eretria, was the pupil of Nicomachus of Thebes. He was the most rapid painter of antiquity. Philoxenus was particularly distinguished for a Battle of Alexander and Darius, painted by order of Cassander, king of Macedon, and therefore probably not long after 316 B.C. It is not improbable that the large mosaic, apparently representing the battle of Issus, which was discovered in Pompeii, in the so-called house 'del Fauno,' and is still preserved there, is a repetition of the celebrated picture by Philoxenus of that subject.

PHILTER (φίλτρον, *philtrum*) was a potion given among the Greeks and Romans to excite love. It is doubtful of what these potions were composed, but their operation was dangerous, and often deprived persons of their reason. (Ovid, 'Ar. Amat.' ii. 106.) Lucretius is said to have died from drinking a potion of this kind, and the madness of Caligula is attributed by some to a similar potion, which was given him by his wife Cæsonia.

PHLEGM is the mucus secreted by the air passages. [MUCUS.] In its common acceptation the term includes nearly all materials coughed up from the lungs.

PHLEGON, a native of Tralles in Lydia, a freedman of the Emperor Hadrian. Some fragments of his works remain. One was a treatise 'On Wonderful Things;' another 'On *Long*-lived Persons.' A passage cited from the same author, in St. Jerome's Latin version of the Chronicle of Eusebius, has been supposed by some critics to refer to the miraculous darkness which prevailed at our Lord's crucifixion; but the citation, if fairly examined, is of no value as a testimony to the miraculous darkness. (See Dr. Adam Clarke's Remarks on it in his Commentary on St. Matthew xxvii. 45.)

PHLEGRÆI CAMPI, the ancient name given by poets to a volcanic hilly region situated west of the city of Naples, embracing the not yet extinct volcano called La Solfatara, the basins of the Lakes of Agnano and Averno, the extinct crater called Degli Astruni, that called Monte Barbaro, and the hill called Monte Nuovo, which was thrown up by an eruption in 1538 on the site of the former Lake Lucrinus; in short, the whole district round Pozzuolo, bounded on the east by the hill of Posilipo, which separates it from the basin of Naples Proper, and Mount Gaurus and Mount Grillo on the west and south-west, which divide it from the coasts of Cumæ and Baiæ. On the north this volcanic district is bounded by the plain of Campania. The name Phlegræi Campi does not comprehend the whole volcanic region west of Naples, which includes even the island of Ischia. With the exception of the small hill of Solfatara, which emits a sulphurous smoke, the other craters of this region have long been extinct.

PHLEUM, a genus of grasses, contains, among many unimportant species, one of considerable agricultural value. This, the *P. pratense*, or Meadow Cat's-tail Grass, is generally found in the most fertile pastures, and is regarded as a sign of rich soil.

PHLOGISTON, an hypothetical substance, by supposing the existence of which Stahl explained

the phenomena of combustion. He imagined that by combination with phlogiston a body was rendered combustible, and that its disengagement occasioned combustion, and after its evolution there remained either an acid or an earth: thus sulphur was by this theory supposed to be composed of phlogiston and sulphuric acid; and lead, of the calx of lead and phlogiston, &c.

At this period however oxygen had not been discovered, and although Jean Rey had shown that metals by burning increased in weight, and Hooke and Mayow had attributed combustion to the presence of the air in which it occurs, yet the doctrine proposed by Stahl maintained its ground for about half a century. Soon after the discovery of oxygen gas by Dr. Priestley, the experiments which others had made on the calcination of the metals were repeated with great accuracy by Lavoisier; the consequence was, that the phlogistic theory gave way to the antiphlogistic; for the combustion, which had been attributed to the extrication of phlogiston, was known in all common cases to be derived from the absorption of oxygen, and this explained the increase of weight which bodies acquired by combustion, wherens on the phlogistic theory they ought to have suffered a diminution by the process.

PHLORIZIN, a peculiar vegetable matter which exists in the bark of the trunk and roots of the apple, pear, cherry, and plum trees. It is a transparent, colourless, bitter, acicular, crystalline substance, composed of hydrogen, carbon, and oxygen.

PHOCA. [Seals.]

PHOCAS, a native of Asia Minor, of an obscure family, entered the army under the reign of the Emperor Mauritius, and attained the rank of a centurion. He headed a successful rebellion, was proclaimed emperor, and crowned by the patriarch, A.D. 602. Mauritius being taken, was put to death, together with his five sons, and some time after the rest of his family shared the same fate. Khosru II., the Persian monarch, took up arms to avenge the cause of Mauritius, and carried on a destructive war in the Asiatic provinces. Phocas found more favour with Rome. Gregory I. wrote him some complimentary letters. Phocas is said to have acknowledged Boniface II. as the head of all the Christian churches; but that which is better authenticated is his act of donation of the Pantheon at Rome to Boniface IV., to be transformed into a Christian church, in 607.

In the mean time insurrections broke out in several parts of the Eastern Empire, which the suspicions and cruelties of Phocas only served to exasperate. Phocas was eventually put to a cruel death by order of Heraclius, son of the exarch of Africa, who succeeded him in the empire in 610.

PHOCENIC ACID and PHOCENIN. This last is a peculiar fatty matter contained in the oil of the porpoise, combined with olein and a very small quantity of phocenic acid. Phocenin exhales a weak peculiar odour, somewhat resembling that of æther and phocenic acid. It is insoluble in water. *Phocenic Acid* is colourless, liquid at usual temperatures, and in appearance resembles a volatile oil. It has a very strong smell, and its taste is sour and penetrating. It remains liquid below 32°, and boils at about 212°. It is composed of carbon, oxygen, and hydrogen.

PHO'CION, an Athenian general and statesman, was a contemporary of Demosthenes. His first appearance in history is at the battle of Naxos, B.C. 376. He survived Demosthenes four years, and, according to Thirlwall, is the representative of that party in Athens to which Demosthenes was the constant antagonist. Phocion attended the school of Plato, and afterwards that of Xenocrates.

To a stern and forbidding aspect, a stoical demeanour, and habits of rigid simplicity, Phocion united a kind and generous heart. These qualities secured for him so great a measure of popularity that he was forty-four times elected general, and that in an age when public offices were generally obtained by bribery. He was also heard with so much attention in public, that even Demosthenes dreaded the effect of his terse and pithy harangues.

Plutarch records many of his sayings, which contain much wit and point, and a great deal of political wisdom. Phocion often led the Athenian armies, and successfully; but he seems to have acted the part of an ambassador better than that of a general. His death (B.C. 317) took place under circumstances much like those which accompanied that of Socrates. During the confusion which ensued after the death of Alexander, a revolution occurred at Athens, and the democratic party, drunk with success, condemned their chief opponents to death. Among these was Phocion; he died with the greatest composure, and left an injunction to his son to preserve no remembrance of the wrongs which Athens had done to his father.

PHOCIS was bounded on the S. by the Corinthian Gulf, on the W. by Doris and the Locri Ozolæ, on the N. by the Locri Epicnemidii and Opuntii, and on the E. by Bœotia. Strabo says (ix. p. 416) that Phocis was divided into two parts by the range of Parnassos, which extends in a south-easterly direction through Phocis till it joins Mount Helicon on the borders of Bœotia. Parnassos and the mountains which separate Phocis from Locris form the upper valley of the river Cephissus, on the banks of which there is some fertile country, though in many parts the mountains approach very near both banks of the river. The southern part of Phocis is almost entirely covered with the mountains which branch off to the south from the huge mass of Parnassos, though there are a few fertile plains between these mountains, of which the largest is the celebrated Crissæan plain. In the Persian invasion Xerxes ravaged the country at the instigation of the Thessalians, who were their enemies. The great event in the history of Phocis was the Sacred War, which ended in the ruin of the Phocians. [Philip of Macedonia.] The chief towns of Phocis were Delphi [Delphi] and Elatea, which commanded the chief road which led from northern Greece into Bœotia. Cirrha, the port of Delphi, was at the head of the Cirrhæan Gulf, now the Gulf of Salona. The next town to Cirrha on the coast was Anticyra.

PHOCY'LIDES, of Miletus, was a philosopher and poet, and flourished about B.C. 535. An Admonitory Poem (Ποίημα Νουθετικὸν) is attributed to this Phocylides, of which there are several editions, some separate and some with Theognis and others. (Bergk, *Lyrici Poetæ Græci.*)

PHŒNI'CE, PHŒNICIANS (Φοινίκη, Φοίνικες). Phœnice proper (incorrectly called Phœnicia), was a very small country. It extended along the eastern coast of the Mediterranean, from the town of A'radus and the river Eleutherus, on the north, to Mount Carmel, or Dora, on the south. It was bounded on the east by the mountains of Libanus and Antilibanus, from which numerous streams descended, which rendered the land exceedingly fertile.

This short line of coast was covered with numerous towns, celebrated for their arts and manufactures. The most southerly town of importance was Acco, called by the Greeks Acca, and subsequently Ptolemáis (St. Jean d'Acre). In the time of Augustus it was a large city; and under Claudius it became a Roman colony. [ACRE.]

North of Acco was TYRE, the principal of the Phœnician cities, and north of Tyre was SIDON: Between Tyre and Sidon was Sarepta (Sarphad), which is mentioned in the history of Elijah (1 Kings, xvii. 9) under the name of Zarephath. About eight miles and a half north of Sidon was Bérytus (Beirout or Bairuth), a very ancient town with a harbour. It also became a Roman colony under the name of Felix Julia.

Twenty-four miles north of Berytus was Byblos, near the sea; and north of Byblos was Tripolis, which originally consisted of three distinct cities; and still further north was Aradus, on an island, the chief town of Phœnicia next to Tyre and Sidon. It is the Arvad of the Old Testament.

The Phœnicians were a branch of the Semitic or Aramæan nation, and are said to have dwelt originally on the shores of the Red Sea or of the Persian Gulf. But they must have been settled on the coast of the Mediterranean at a very early period, for Sidon was a great city in the time of Joshua (Josh. xix. 28). The Phœnicians excelled all the nations of antiquity as a maritime people. Libanus supplied them with building materials for their ships; and they had iron and copper at Sarepta. They communicated with India by the caravans of Arabia and Babylon, and extended their navigation beyond the Straits of Gibraltar. They settled in some of the islands of the Mediterranean, and planted colonies on the coast of Africa, of which Carthage was the chief. Herodotus says that they circumnavigated Africa.

The Greeks attributed the invention of letters to the Phœnicians, and there is little doubt that the Greek alphabet was derived from the Phœnicians. They attained great perfection in the arts. The Tyrians supplied Solomon with artificers for the building and decoration of his temple (2 Chron. ii.). The form of government appears to have been monarchical. The cities of Phœnice were originally independent of one another. After the conquest of Samaria and Judæa, the Phœnicians became successively subject to the Assyrians, Babylonians, and the Persians; and they supplied the chief part of the navy in the war between the Greeks and the Persians. They afterwards were included in the Syrian kingdom of the Greeks, and finally in the Roman province of Syria.

Their language was closely allied to the Hebrew, of which we have evidence in coins and inscriptions, and in the testimony of Jerome. The subject is discusssed by Gesenius, 'Paläographische Studien über Phönizische und Punische Schrift,' 4to, Leipzig, 1835.

PHŒNICIA. [PHŒNICE.]

PHŒNICOPHA'US, M. Vieillot's name for a genus of birds founded on the *Malkohas* or *Malcohas*. Levaillant appears to have been the first who proposed a separation of the form from the Cuckoos, and Mr. Swainson, who in his 'Synopsis' places it among the *Crotophaginæ*, or Horn-Bill Cuckoos, 'observes that the passage from the Toucans to the Cuckoos seems to be marked by such genera as *Phœnicophaus* or *Saurothera*, where the bill, as in the first, is either much larger and thicker than in the generality of Cuckoos, and is thus assimilated in shape to that of the Toucan, or as in *Saurothera*, where the edges become dentated.

Examples. — *Ph. pyrrhocephalus, Ph. Cumingii, Ph. viridorostris.*

PHŒNICOPTERUS. [FLAMINGO.]

PHŒNIX (Φοῖνιξ), one of the most renowned of the fabulous wonders of antiquity, defined by the Arabians to be 'a creature whose name is known, its body unknown.' The earliest author who mentions it is Hesiod (Plut. 'De Defectu Orac.' cap. 11; Plin. 'Hist. Nat.,' lib. vii. cap. 49), who merely says that it lives nine times as long as a crow. The first detailed description and history that we meet with is in Herodotus, whose words on that account deserve to be quoted at length. 'There is also,' says he, in his account of Egypt (lib. ii., cap. 73), 'another sacred bird, the name of which is the Phœnix. I have not myself seen it except in a picture, for it seldom visits them, only (as the people of Heliópolis say) every five hundred years. And they say that he only comes when his sire dies. And he is, if he is like his picture, of size and shape as follows: part of his plumage is gold-coloured, and part crimson; and he is for the most part very like to the eagle in outline and bulk. And this bird, they say, devises as follows, but they say what is to me beyond belief; that setting out from Arabia, he brings his sire to the temple of the sun; that he covers him with myrrh, and buries him in the temple of the sun; and that he conveys him thus: first he forms an egg of myrrh as large as he is able to bear, and afterwards tries whether he can carry it; and when he has made the trial, upon this he hollows out the egg, and puts his sire into it, and covers with other myrrh that part of the egg where he had made the hole and put in his sire; and when his sire lies inside, the weight [of the egg] is the same [as it was before it was hollowed out], and having covered him up, he conveys him to Egypt into the temple of the sun. Such are the things

which they say this bird performs.' Such is the story as told in Herodotus, and it is substantially the same as what was afterwards, though with various embellishments, repeated and believed for more than a thousand years. Between the times of Herodotus and Tacitus, the fable of the Phœnix is told more or less fully and circumstantially by numerous classical writers.

PHŒNIX, a southern constellation of Bayer, which may be best described as close to (but farther from the south pole than) the bright star in Eridanus (Achernar).

PHŒNIX, a genus of palms, is common in India, and in the north of Africa.

Phœnix dactylifera, or the Date-Tree, is probably one of the earliest known of the palms, and though belonging to a family which abounds and flourishes most in tropical regions, itself attains perfection only in comparatively high latitudes.

The extensive importance of the date-tree is, says Dr. Clarke, one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, Arabia, and Persia, subsist almost entirely on its fruit. They make a conserve of it with sugar, and even grind the hard stones in their hand-mills for their camels. In Barbary they form handsome beads for paternosters of these stones. From the leaves they make couches, baskets, bags, mats, brushes, and fly-traps; the trunk is split and used in small buildings, also for fences to gardens, and the stalks of the leaves for making cages for their poultry. The threads of the web-like integument at the bases of the leaves are twisted into ropes, which are employed in rigging small vessels. The sap is obtained by cutting off the head of the palm and scooping out a hollow in the top of the stem, where, in ascending, it lodges itself. Three or four quarts of sap may be obtained daily from a single palm, for ten days or a fortnight, after which the quantity lessens, until at the end of six weeks or two months, the stem is exhausted, becomes dry, and is used for fire-wood. This liquor is sweetish when first collected, and may be drunk as a mild beverage, but fermentation soon takes place, and a spirit is produced, which is distilled, and forms one of the kinds of arrack. Such being the importance and various uses of the date-tree, it is not surprising that in an arid and barren country it should form so prominent a subject of allusion and description in the works of Arab authors, and that it should be said to have 300 names in their language. Many of these are however applied to different parts of the plant, as well as to plants of different ages.

Phœnix sylvestris is a species common in the arid parts of India. It yields, by incision, tarri, or palm wine, commonly called toddy. Mats and baskets are made of the leaves. Sugar has always been made from this species, and accounts of it have been given by Drs. Roxburgh and Buchanan Hamilton. Date-sugar is not so much esteemed in India as that of the sugar-cane, and sells for about one-fourth less.

P. farinifera is a dwarf species of this genus, which is a native of dry ground or sandy hills, not far from the sea on the Coromandel coast. The trunk encloses in its substance a large quantity of farinaceous substance, which the native use for food in times of scarcity.

PHOLADOMY'A, a genus of bivalve shells, for the knowledge of which we are indebted to Mr. G. B. Sowerby, who described it from a recent species brought from the island of Tortola by Mr. Nicholson, which is now in the British Museum.

The discovery of this recent species led at once to the more perfect knowledge of several fossils, whose genus, as Mr. Sowerby observes, in his 'Genera' (No. xix.), was before exceedingly doubtful, insomuch that, from a consideration of their external appearance alone, authors had been induced to place them in several genera, to none of which they really belonged; and he refers to Sowerby's 'Mineral Conchology,' t. 197, 225, 226, 227, 299, and 327, where several of the species are figured under the names, *Cardita producta*, *obtusa*, *lyrata*, *deltoidea*, and *margaritacea*; and *Lutraria lyrata*, *ovalis*, *ambigua*, and *angustata*. These occur in several rocks of the oolite series, particularly the cornbrash, inferior oolite, and fullers' earth; as well as in the lias, the London clay, and the Sutherland coal-field; also in the dark-coloured clay at Alum Bay, Isle of Wight. Example, *Pholadomya Candida*. Marine, and, most probably, in deep water. The specimen from which Mr. Sowerby characterised the genus was thrown upon the beach at Tortola, after a hurricane.

PHOLAS, a name given by Linnæus to a genus of conchifers, placed by Lamarck in his family *Pholadaria*.

Mr. Swainson makes the *Pholidæ* the first family of his tribe *Macrotrachiæ*, and thus characterises that family:—

'Shell bivalve, sedentary, generally perforating, opening at one or both ends; the valves often prolonged into a shelly tube, sometimes of great length, representing the *Tubulibranchia*.'

Under this family he assembles several forms, and makes it consist of the following genera and subgenera:—

1, *Aspergillum*; including the subgenera *Aspergillum*, *Clavagella*, and *Fistulana*.

2, *Gastrochina* (*Gastrochæna*), Lamarck.

3, *Pholadomya*, Sowerby.

4, *Pholus*, Linn., with the subgenera *Pholas*, Linn., *Pholidæa*, Leach, *Martesia*, Leach, and *Xylophaga*, Sowerby.

5, *Teredo*, Linn., with the subgenera *Teredo*, Linn., and *Teredina*.

Locality, Habits, Organization, &c., of the genus *Pholas*.—The geographical distribution of the *Pholades* is very wide, and their habit of boring hard substances, such as indurated mud or clay, wood, and stone, renders them, as well as other terebrating testaceans, an object of anxious interest to those who construct submarine works. The Breakwater at Plymouth was soon attacked by the *Pholades*, and in Dr. Goodall's fine collection, now dispersed by the hammer, there was a specimen from the Breakwater perforated by these

testaceans. Wood is also attacked by this genus, and submarine piles are consequently exposed to their ravages. To counteract their operations in the latter substance, nails closely driven into the submerged part of the timber, as in the piles which support the pier at Southampton, seem to be the best safeguard hitherto applied. When unmolested the young *Pholades* excavate burrows in the substance which chance has opposed to them, or to which choice—for it is not improbable that the young shell-fish may in some cases have the faculty of making the selection of the material in which it is to pass the whole of its life—has directed it.

The mode in which this operation of boring is conducted is not quite satisfactorily accounted for; but the better opinion seems to be that, in this, as in other excavating testaceans, the currents of water produced by the vibratile cilia of the animal, as noticed by Mr. Garner, are the principal agents. Mr. G. B. Sowerby, in his description of *Pholas acuminata*, found by Mr. Cuming at Panamà in limestone at low water, notices one specimen in that gentleman's collection, as demonstrating a fact of considerable importance to geologists: it is in argillaceous limestone, very much resembling lias, and, in forming the cavities in which it resides, it has, by such chemical process as, in Mr. Sowerby's opinion, frequently takes place, absorbed a much greater quantity of the rock than could be retained or converted; this is again deposited at the upper part of the cavity, and thus the rock is recomposed. ('Zool. Proc.,' 1834.)

Fossil Pholades. — Mr. G. B. Sowerby observes that fossil *Pholades* are rare, but that they occur in the calcaire grossier and contemporaneous formations, in several places, and also in our crag.

PHO'RMIUM, a genus of plants of the natural family of *Liliaceæ*, contains only a single species, which is remarkable for its useful product, so well known under the name of the New Zealand Flax, and which is found indigenous in New Zealand and Norfolk Island. The leaves of this plant yield a very beautiful and a very strong fibre, which was some time ago imported in considerable quantities. It has not however been found so useful as was expected, in consequence of its having the defect of breaking easily when made into a knot.

PHOSPHORIC ACID. [PHOSPHORUS.]

PHOSPHORUS. This elementary, solid, non-metallic body was discovered in 1669, by Brandt, an alchymist of Hamburg. It is contained in many substances of animal origin, but it is usually procured from bones.

Phosphorus is solid, translucent, and nearly colourless, but sometimes it has a yellow reddish tint; it is so soft that it may be indented by the nail, and it is very readily cut. When heated to about 108° it fuses, and at 550° it is converted into vapour. It has a peculiar smell when exposed to the air, but this is probably derived from the action of the oxygen of the air upon it. Neither water nor alcohol dissolves phosphorus, but it is dissolved by æther and by oils. It emits light when exposed to the air in the dark, and hence its name (from *φῶς, light,* and *φέρω, to carry*). It is extremely inflammable, and has been known to take fire spontaneously in the atmosphere when its temperature was not above 60°. Its specific gravity is about 1.77.

Oxygen and Phosphorus combine to form several compounds:—*Oxide of Phosphorus* ($P^3 O^1$) is a red pulverulent substance, which is inodorous, tasteless, and burns at a low red heat. *Hypophosphorus Acid* ($P^2 O^1$) is liquid, uncrystallizable, has a powerful taste, is decomposed by heat, and combines with various bases to form a very deliquescent class of salts called *Hypophosphites*. *Phosphorous Acid* ($P^2 O^3$) is a crystalline mass which readily dissolves in water; it has a sour taste, and combines with bases to form the salts called *Phosphites*. *Phosphoric Acid* ($P^2 O^5$) is colourless, inodorous, dense, and extremely sour. When combined with different quantities of water, Phosphoric Acid assumes three different forms, which have obtained the names of *Phosphoric Acid, Pyrophosphoric Acid,* and *Metaphosphoric Acid*.

Hydrogen and Phosphorus combine to form two or three different substances, of which the principal is *Phosphuretted Hydrogen Gas* ($P^2 H^3$). This gas is colourless, and has a disagreeable odour resembling that of onions. Its specific gravity is about 1.760.

Chlorine and Phosphorus combine in two proportions. The *Protochloride of Phosphorus* ($P^2 Chl^3$) is limpid and colourless; it has a suffocating odour, and fumes when exposed to the air; its vapour is combustible. *Perchloride of Phosphorus* ($P^2 Chl^5$) is a white, flaky, volatile compound, fusible under pressure.

Nitrogen and Phosphorus form *Phosphuret of Nitrogen* ($P^1 N^1$). It is a light white powder, remarkable for its power of resisting the action of fire, water, chlorine, acids, and alkalies.

Sulphur and Phosphorus form *Phosphuret of Sulphur* ($P^1 S^2$), a brownish liquid, which remains uncongealed at a very low temperature.

Phosphorus may be made to combine with *Bromine, Iodine, Selenium,* and most of the metals. There are two *Bromides*, one a liquid, and the other a yellow solid; there are also two *Iodides*, one reddish-brown and one black.

Medical Properties of Phosphorus.—This elementary substance exists in the bones and other hard parts of animals, and in many of the fluids, especially the excretions.

It is of all stimulants the most powerful and diffusible, but, on account of its activity, highly dangerous. Its poisonous action seems to be connected with its strong affinity for oxygen, by which it is converted into phosphorous acid and phosphoric acid.

Little use is made of phosphorus or its oleaginous solutions in medical practice in Great Britain, though in cases of extreme prostration of the nervous system it is not without its value.

In the event of a poisonous dose being taken, bland mucilaginous fluids should be freely administered, followed by magnesia or chalk.

Dry phosphoric acid is sometimes used in the form of pills, but this is not an eligible mode; the

common form is that of solution, constituting the dilute acid of the 'Pharmacopœia.' This differs from the other dilute mineral acids in not affecting so strongly the digestive organs, on which account it may be persevered in for a longer time. It is recommended in disordered states of the mucous surfaces, and also in states of debility, characterized by softening of the bones, and a phosphatic condition of the urine.

PHOSPHORUS, BOLOGNIAN, is one of the substances which shine in the dark after having been exposed to the sun's rays. It was first prepared by Vincenzio Cascariolo, a shoemaker of Bologna, in 1630. If sulphate of barytes be powdered, made into cakes with gum tragacanth, and calcined carefully, they will become Bolognian Phosphorus.

PHOSPHORESCENCE IN PLANTS AND ANIMALS. Organic bodies under certain circumstances become luminous, and upon the supposition that this appearance depends on the combustion of phosphorus at a low temperature, the phenomena has been called phosphorescence. This luminosity is observed both during the decomposition of the bodies of plants and animals as well as whilst they are still living.

The occurrence of luminosity in decaying plants seems to depend on a slow process of combustion.

In living plants luminosity has been frequently observed. It is most constant amongst some forms of fungi, especially of the genus *Rhizomorphæ*. In the coal-mines in the vicinity of Dresden the species of *Rhizomorphæ* are so numerous as to dazzle the eye by the brilliant light they afford.

Another class of plants in which light has been observed is the Mosses. This depends upon the fact, that at certain seasons the utricles of some species assume a globular form, and being partly transparent, the light is refracted and reflected in such a way as to present a luminosity on the surface of the vesicles.

Another class of these phenomena is that which is exhibited by the flowers of some plants. The first observation on this subject was recorded by Linnæus, and made by his daughter Christina Linnè. It has also been seen by several observers at the same time in different positions, and when one has seen it the others have seen it also. A correspondent of the 'Gardener's Chronicle,' Oct. 1843, says 'I have frequently observed the luminous appearance of garden plants, and have looked for it in each succeeding summer on the double marygold, and more especially on the *Papaver pilosum*, the hairy red poppy, in my garden in Worcestershire. In the evening, after a hot dry day, the flashes of light have afforded much amusement to myself and others.' It is to this phenomenon that Coleridge alludes in the following lines:—

> 'Tis said on summer's evening hour
> Flashes the golden-colour'd flower
> A fair electric flame.

Decaying animal bodies frequently emit a luminous appearance, which has generally been attributed to the presence of phosphate of lime in their skeletons, which become decomposed and yield phosphorus when exposed to the action of organic compounds in a state of decomposition. It is to this cause that the luminosity of putrefying fish is attributed. Light has also been observed on the bodies of those dying of spontaneous combustion. [COMBUSTION, SPONTANEOUS.] The emission of light is a very constant phenomenon of many of the invertebrate animals under peculiar circumstances. This is the case with many of the Infusoria, the smaller Crustacea, and Annelida, and especially the Acalephæ.

Amongst insects this phenomenon is not uncommon. Those which possess the greatest luminous power belong to the Coleoptera, and of these the two families represented by the Firefly and the Glow Worm are the most distinguished. [ELATERIDÆ; LAMPYRIDÆ.]

PHO'TIUS was born in the early part of the ninth century, of a patrician family of Constantinople. He attained great proficiency in all kinds of learning, and was irreproachably moral. He was employed by the emperor Michael III. in various important offices, and when the patriarch Ignatius was removed and banished, Photius, though a layman, took all the various clerical orders one after the other in six consecutive days, and was installed in the patriarchal chair, A.D. 853. Though confirmed by two councils in 853 and 859, and acknowledged by the papal legates, his appointment was always felt to be illegal, and on a dispute arising with Pope Nicholas I. as to the jurisdiction of the sees over Bulgaria, a council was assembled at Rome in 862, in which the election was declared illegal, and Photius and his abettors excommunicated. Photius however remained in his see, and in 866 assembled a council at Constantinople, before which he produced five charges against the Roman church:—1, that they fasted on the Sabbath; 2, that they allowed the use of milk and cheese during the first week in Lent; 3, that they forced celibacy on the clergy; 4, that their bishops alone anointed persons with the holy chrism, withholding that power from presbyters; 5, that they had interpolated the Nicene creed on the subject of the Holy Ghost, by adding the word 'filioque,' thus asserting the Holy Ghost to proceed from the Son as well as from the Father.

In the year 867, after the murder of the Emperor Michael, Basilius the Macedonian ascended the throne, who restored Ignatius to his see; and in a general council assembled at Constantinople, A.D. 896, which was attended by the legates of Pope Adrian II., Photius was convicted of schism, and his deposition confirmed. This is called the eighth Œcumenical council, having been acknowledged by both the Eastern and Western churches.

Photius found means to deprecate the hostility of the emperor, and when the patriarch Ignatius died in 877, Photius was replaced in the patriarchal see. In 879 Photius assembled a new council at Constantinople, in which the word 'filioque' was erased from the creed.

In the year 886, Leo, the son and successor of Basilius, exiled Photius into Armenia, where he died some years after; but the epoch of his death is not exactly known.

Photius wrote several works, of which the

most important was his 'Myriobiblon, sive Bibliotheca Librorum quos legit et censuit Photius,' with a Latin translation, fol., 1653. Imm. Bekker published the Greek text, with an index, Berlin, 1824, 2 vols. 4to. The Bibliotheca is a kind of review and epitome of the works which he had read, many of which have since been lost.

PHOTOGENIC DRAWINGS. [PHOTOGRAPHY.]

PHOTOGRAPHY. *Photographic Pictures* are facsimile representations of objects, produced by the chemical action of light on a prepared tablet, upon which the images of the objects are thrown by a camera-obscura. Such a process has been named after its inventor the Daguerreotype; but other methods have received the names of Calotype, Talbotype, Chrysotype, &c. The process generally may be termed photography (light-drawing), or heliography (sun-drawing). The invention was first formally communicated to the public by M. Arago, who read an account of the Daguerreotype process before the Academy of Sciences, January 7, 1839. From that moment Daguerre (who was afterwards rewarded by a pension by the government) and his invention engrossed general attention. The discovery was spoken of as little short of miraculous; and though it does not realise all the sanguine hopes of its early inventors, the invention is unquestionably highly valuable, because it not only ensures perfect fidelity of likeness where it is most essential, and where it is hardly attainable by the most practised and patient hand and eye, but also gives us the minutest details—those which are imperceptible to the naked eye, and of course cannot possibly be represented upon paper, yet become visible in a photographic drawing when it is examined with a magnifying-glass.

In Daguerre's original process, the photographic drawings were produced upon plates of copper coated over with silver. After being washed with a solution of nitric acid, the plate was put into a well-closed box, where it was exposed to the action of iodine, a small quantity of the latter being placed at the bottom of the box with a thin gauze between it and the plate. A layer of ioduret of silver was thus formed on the surface of the plate, and manifested itself by the yellow hue produced on the silver, which shows that the process of giving the plate the sensitive coating on which the action of light delineates objects is completed. Thus prepared, the plate was next placed within a camera-obscura of particular construction; and the delineation of the object was then effected in a very short space of time, but had to be afterwards brought out and rendered distinct by another operation, namely submitting the plate to the action of vapour of mercury. Even then the process was not completed, for the plate had to be plunged into a solution of hyposulphate of soda, and afterwards washed in distilled water, which being done, the impression was fixed, and the plate could be exposed to light with perfect safety.

Mr. Fox Talbot, and other experimenters, were engaged upon somewhat similar researches about the same time as M. Daguerre; and within the last nine years numerous improvements have been introduced by Herschel, Talbot, Hunt, Claudet, Beard, Highschool, and others.

By the experiments of these individuals much has been done to render Daguerreotype portraits more pleasing, by improved management of the light, and by placing behind the sitters painted screens, to relieve the head, and to form artificial backgrounds. One of the greatest difficulties in the original process arose from the circumstance, that, as the image produced in the camera-obscura was totally invisible until brought out by a subsequent exposure to the vapour of mercury, it was impossible to tell precisely at what moment the action of the light should be stopped, to avoid, on the one hand, an image imperfectly developed, and, on the other, the misty undefined appearance occasioned by the unavoidable motion of the object to be copied (whenever it is an animate object), and the discoloured or burnt appearance of an image which has been exposed too long to the chemical action of light. This inconvenience has been remedied by many ingenious devices. One important class of improvements has reference to the means of fixing and securing from injury by the subsequent action of light or other means, the Daguerreotype image. Considerable progress has been made towards transferring the colours of natural objects to the Daguerreotypes; but in the ordinary coloured Daguerreotypes, some of which make a tolerably near approach to the effect which might be expected if colours could be fixed in the camera-obscura, the tinting is produced by the application of finely powdered colours to the surface of the photographic impression, which is previously coated with an alcoholic solution of copal, and nearly dried; so that the colouring, which is so delicately performed as not to impair the distinctness of the impression, is not, in any degree the result of the action of light.

The process invented by Mr. H. Fox Talbot, and called the *Talbotype* or *Calotype*, is a photographic process widely different from that of M. Daguerre. According to Mr. Talbot's description, given before the Royal Society in 1841, the following is his mode of producing photographs or Calotypes upon paper. The paper, which should be of the best kind of writing-paper, smooth, of a close and even texture, and without water-marks, is in the first instance to be washed on one side with a solution of nitrate of silver; the solution being applied with a soft brush, and the surface either dried cautiously at a distant fire, or spontaneously in a dark room. When dry, or nearly so, it is dipped in a solution of iodide of potassium, and left in that solution for two or three minutes; after which it is dipped into pure water, partially dried with blotting-paper, and then finished drying either spontaneously or by a fire, which will not now injure it. Though not very sensitive to light, it should be kept shut up in a portfolio or drawer until wanted for use; and, if so protected from the light, it may be kept for any length of time. When required for use, but not until then, the iodized paper is to be washed with a solution of gallo-nitrate of silver. After a pause of half a minute

the paper should be dipped into pure water, then blotted dry, and finally dried at a considerable distance from a fire. In this state the paper (which is extremely sensitive) is subjected to the action of light in a camera-obscura, after which the image is brought out by washing it again with the gallo-nitrate of silver, and warming it before a fire. In some cases however a *strong* impression will become visible in a minute or two after applying the gallo-nitrate of silver, without the aid of heat. The image thus brought out is subsequently fixed or rendered permanent by washing with water, lightly drying with blotting-paper, and then washing with a solution of bromide of potassium. A minute or two after the application of this solution the paper is again dipped in water, and finally dried. The picture thus produced is what is termed a *negative* one, in which all the light parts of the object represented are shown of a dark colour, and *vice versâ*, and the representation is also the reverse of the original in position. It is however, according to Mr. Talbot's second patent, rendered transparent by the application of wax, and by laying it face downwards upon another sheet of photographic paper (prepared in a way different from the former), and exposing both to the light, a copy is produced in which the objects are brought into their true position, and the right effect of light and shade is obtained; the copy, or secondary impression thus produced, having very much the appearance of a sepia drawing.

The action of light in this way seems as if it would give rise to a wholly new branch of science, to which Sir J. Herschel has proposed to give the name of *Actino-Chemistry* ('sun-beam chemistry.')

Most of the numerous patented or proposed improvements in the art depend chiefly on the mode of producing the pictures. The Chromatype, Chrysotype, Cyanotype, Amphitype, and Ferrotype, all are so many modes of producing and fixing the impressions. Some of the improvements however relate to the mechanism of the camera-obscura, in which the sensitive surface is placed.

PHOTO'METER (literally 'light-measurer,' from *φῶς* and *μέτρον*), the name given to instruments constructed for the purpose of measuring the relative illuminating powers of different sources of light. Photometers have been constructed by Professor Leslie, and by Mr. Ritchie, late professor of natural philosphy in London University College, but a mode of comparing the illuminating powers of two lights was suggested by Count Rumford, which is remarkable for the facility with which it may be applied, and the simplicity of the requisite apparatus, nothing more being needed than a smooth surface of small extent and of a light uniform colour, and a blackened stick for throwing a shadow. The surface is illuminated by the two lights experimented upon, which are to be so placed, that when the stick is interposed between them and the surface, the two shadows may be nearly in contact, which will enable the eye to decide whether they are of equal depth, and will at the same time ensure the intercepting of rays equally inclined to the surface. So long as the shadows are of unequal depth, one of the lights must be brought nearer to or retired farther from the surface till an equality of depth is obtained, and then the squares of the perpendicular distances of the lights from the surface give the ratio of their intensities. If an equality between the inclinations of the intercepted rays to the surface cannot be obtained, then, when the two shadows are of the same depth, the intensities of the lights will be directly proportional to the squares of their perpendicular distances from the surface, and inversely proportional to the sines of the inclinations of the intercepted rays to the surface. This method is theoretically perfect, when applied to lights of the same colour.

PHRAGMITES, or the Reed, is a plant formerly regarded as a species of *Arundo*, but now separated from that genus. It is a tall plant with annual stems and a perennial root, and is found exclusively in places overflowed even during summer. In such situations it occurs all through Europe, and is common in Siberia, Japan, North America, and even New Holland, forming thick coverts, and yielding an abundance of stout durable grass of great value for the purpose of thatching the roofs of buildings.

PHRASE, in Music, a succession of sounds either in melody or harmony, expressing an unbroken sense more or less complete, and terminating in a pause (*repos*), that is, a comparatively long note or a rest: thus forming a cadence more or less perfect.

PHRENOLOGY (from *φρὴν*, mind, and *λόγος*, discourse) is, in the words of Dr. Spurzheim, the doctrine of the special faculties of the mind, and of the relations between their manifestations and the body, particularly the brain. The fundamental principles of Phrenology, and those in which it chiefly differs from other psychological systems are, that the manifestation of each of the several faculties of the mind depends on a particular part of the brain, and that, *cæteris paribus*, the degree or strength in which each faculty is manifested in each individual, depends on the size of its appropriated portion of the brain, or (as it is termed) its organ.

The first principle, that of the plurality of organs in the brain, is supported, 1, by the analogy of the other compound organs or systems in the body, in which each part has its special function; as, for example, in the digestive system, in which the stomach, liver, and other organs perform each their separate share in the common result of digestion of the food; 2, by the different degrees in which, in different individuals, the several mental functions are manifested; 3, by the phenomena of some forms of mental derangement, in which it often happens that the strength of some of the mental faculties is increased while that of others is diminished, and in many cases one function only of the mind is deranged while all the rest are performed in a natural manner; 4, by the fact that the several mental faculties are developed to their greatest strength at different periods of life, some being exercised with great energy in childhood, others

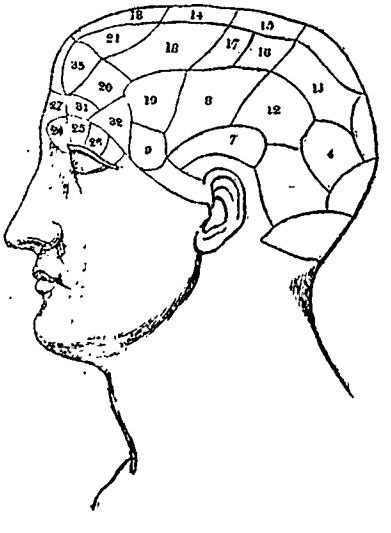
only in adult age; 5, by the phenomena of dreams, in which only a part of the mental faculties are at rest or asleep, while the others are awake, and, it is presumed, are exercised through the medium of the parts of the brain appropriated to them; 6, by the examination of the brains of individuals remarkable for some peculiar propensity or talent, in which a constant correspondence has been found in the development of a certain portion of the brain; and that thus the results of the observations upon which phrenology was first founded by Dr. Gall, exactly coincide with and confirm the arguments by which its truths may, *à priori*, be made to seem probable. Lastly, pain has sometimes been felt in an organ when the faculty with which it is presumed to be connected has been greatly excited; and when a faculty has been morbidly manifested during life, disease has sometimes been found to have affected the corresponding part of the brain.

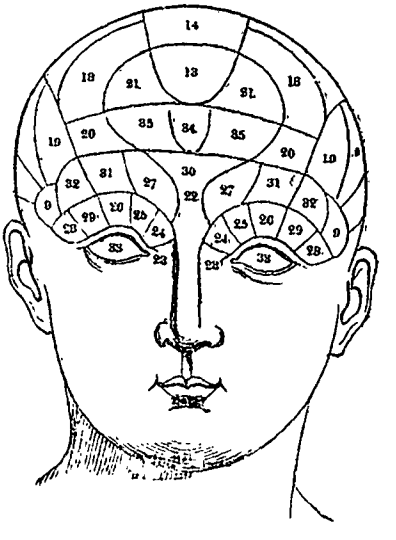
Every power of the mind is regarded by phrenologists as a primitive faculty, and is considered to be manifested through the medium of a separate organ, which, 1, exists in one kind of animal and not in another; 2, which varies in the sexes of the same species; 3, which is not proportionate to the other faculties of the same individual; 4, which does not manifest itself simultaneously with the other faculties, that is, which appears or disappears earlier or later than they do; 5, which may act or repose singly; 6, which individually is propagated in a distinct manner from parents to children; and 7, which singly may preserve its proper state of health or be affected by disease.

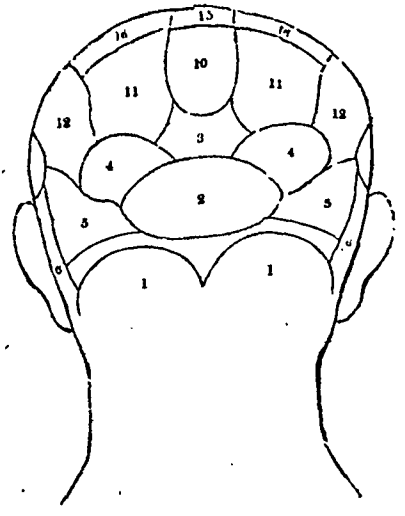
In accordance with these rules Gall enumerated nearly thirty primitive mental faculties, which are admitted, with more or less of modification, by all the phrenologists of the present day; and their number has been augmented by Spurzheim to thirty-five. These faculties Spurzheim divided into moral, or affective, and intellectual. The affective faculties or feelings he again divided into *propensities*, including all those which produce only desires or inclinations, and *sentiments*, including such as not only produce a desire to act, but are combined with some other emotion or affection which is not mere propensity. The intellectual faculties also he divided into the *perceptive* and the *reflective*. The subjoined figures and the references to them will at once indicate this division of the mental faculties, and the situations on the exterior of the head which are supposed to correspond with the portions of the brain belonging to each, according to the system of Dr. Spurzheim. We have also added the figures by which the several organs were marked by Mr. Combe, in the first two editions of his 'System of Phrenology;' in the later editions he has followed the enumeration of Dr. Spurzheim.

Combe.	Spurzheim.	Affective.
		I. *Propensities.*
1.	1.	Amativeness.
2.	2.	Philoprogenitiveness.
3.	3.	Inhabitiveness.
4.	4.	Adhesiveness.
5.	5.	Combativeness.
6.	6.	Destructiveness.
9.	7.	Secretiveness.
8.	8.	Acquisitiveness.
7.	9.	Constructiveness.
		II. *Sentiments.*
10.	10.	Self-Esteem.
11.	11.	Love of Approbation.
12.	12.	Cautiousness.
13.	13.	Benevolence.
14.	14.	Veneration.
16.	15.	Firmness.
17.	16.	Conscientiousness.
15.	17.	Hope.
	18.	Marvellousness.
16.	19.	Ideality.
32.	20.	Mirthfulness, Wit.
33.	21.	Imitation.

Combe.	Spurzheim.	Intellectual.
		I. *Perceptive.*
19.	22.	Individuality.
20.	23.	Configuration.
21.	24.	Size.
22.	25.	Weight and Resistance.
23.	26.	Colour.
24.	27.	Locality.
27.	28.	Calculation.
25.	29.	Order.
	30.	Eventuality.
26.	31.	Time.
28.	32.	Melody.
29.	33.	Language.
		II. *Reflective.*
30.	34.	Comparison.
31.	35.	Causality.







1. Amativeness is the mental faculty which produces the propensity to physical love, or, as it was termed by Dr. Gall, the instinct of propagation. The cerebellum is the organ of this function.

2. Philoprogenitiveness is the faculty which produces the feeling of love towards offspring. The seat of this organ is directly above the middle of that of amativeness; and the energy of the faculty is indicated by the general protuberance of the occipital bone. Though placed in the middle of the head, this organ is of course, like all the others, double, and extends to an equal distance on each side of the median line.

3. Inhabitiveness.—The existence of this, the propensity to inhabit particular regions or countries, which produces the love of home, and which determines in each species the dwelling and mode of life which is best adapted to it, is regarded as doubtful. Dr. Gall placed in this situation the organ of pride in man, and that of the instinct in animals which prompts them to seek and inhabit the heights of mountains or to fly high in the air, believing that faculties which are merely physical in brutes may become moral in man, and that there is an analogy between the feelings which prompt to the pursuit of moral and those which excite the desire of physical elevation. Mr. Combe and many of the Edinburgh school of phrenology name this the organ of concentrativeness, believing that it corresponds to the faculty of maintaining two or more powers in simultaneous and combined activity, so that they may be directed towards one object, a faculty disposing to sedentary pursuits, and a close and steady attention, especially by meditation, to a given object.

4. Adhesiveness is the propensity to attachment or friendship, by which individuals of the same or different kinds are induced to associate together, and which causes men to be attached to the various objects amongst which they are placed.

5. Combativeness is the natural disposition which men and animals feel in various degrees to quarrel or fight.

6. Destructiveness, or the propensity to destroy, is the feeling which is gratified by any kind or mode of destruction. Spurzheim ascribed to it the tendency to all kinds of destruction, whatever were their objects, or the mode in which they were effected. The seat of the organ of destructiveness is on each side of the head immediately above the ear, at No. 6; and its various degrees of development may be seen in a comparison of the width at this part of the heads of carnivorous and herbivorous animals. In order to discover its organ, Dr. Gall is said to have been in the habit of calling together boys from the streets, to endeavour to make them fight. There were of course some who were fond of it, and others who were peaceable and timid: in the former the part of the head marked 5 was prominent; in the latter it was flattened or depressed.

7. Secretiveness is the propensity to act in a clandestine manner; to conceal emotion, and to be secret in thoughts, words, things, and projects. The organ of this propensity is immediately above that of destructiveness, at No. 7.

8. Acquisitiveness is the propensity to acquire. Its organ being found very large in notorious thieves, Dr. Gall considered that there was a natural disposition to theft. The seat of its organ is at the back part of the temples.

9. Constructiveness is the faculty which leads to construction of all kinds: guided by it birds build their nests, rabbits burrow, beavers make their huts; and men are directed by it to manufactures, the practice of the several branches of the fine arts, building, and various manual operations. Its organ is situated at the lower part of the temple, at 9.

10. Self-esteem is the sentiment which gives an individual a high opinion of himself, which in excess produces pride and arrogance, and when moderate and modified by other superior faculties imparts dignity to the mind, and renders it hostile to everything that is mean or degrading. The seat of its organ is at the middle of the upper and back part of the head (10), directly above inhabitiveness (3), with which Dr. Gall confounded it.

11. Love of Approbation, according to Dr. Spurzheim, is the sentiment which makes us regard the opinion entertained of us, and induces the question—What will the world or the people say? The organ is seated on each side of self-esteem.

12. Cautiousness is the disposition of the mind which leads a man or an animal to take precautions in whatever he has to do; 'it doubts, says *but*, and continually exclaims *take care!*' (Spurzheim). Its organ is situated on the upper lateral and posterior part of the head, between *destructiveness* and self-esteem.

13. Benevolence is the disposition of the mind from which result compassion, kindness, philanthropy, mildness, charity, and various other amiable social virtues. The seat of its organ is the upper and middle part of the forehead, just where the hair begins to grow.

14. Veneration. The organ of this faculty was called by Dr. Gall the organ of religion, and he

believed that the disposition to the worship of God was directly proportionate to its development. When the organ of this sentiment is much developed, the head is remarkably elevated, and it was by observing (as Lavater had before done) this peculiarity in the shape of the heads of very pious persons, that the position of the organ on the front part of the top of the middle of the head was determined.

15. Firmness is the faculty which gives constancy and perseverance to the other powers, and contributes to maintain their activity. Its organ is situated at the top of the head, at 15.

16. Conscientiousness is the fundamental and innate sentiment which disposes mankind to look and to wish for justice. The situation of the organ of conscientiousness is on the upper part of the head, on each side of that of firmness.

17. Hope is the sentiment which induces men to believe in the possibility of whatever their other faculties desire; it is not mere desire, for that may continue without any hope of being ever gratified. Its organ is situated on each side of that of veneration.

18. Marvellousness is the sentiment which is principally manifested by a belief in miraculous and supernatural circumstances, and which leads men to be amused with everything that can excite their surprise and wonder. Its organ is situated immediately in front of that of hope.

19. Ideality. Dr. Gall regarded the organ of this faculty as the organ of poetry, finding it much developed in all the great poets of ancient and modern times. The organ of this sentiment is placed by the side of marvellousness, and the two frequently act together.

20. Mirthfulness or Wit. Spurzheim regards this faculty as affective, not as intellectual, in which view it is regarded by Gall, and by the principal phrenologists of the Edinburgh school. The organ is situated in the upper and lateral part of the forehead.

21. Imitation. Those who have this faculty highly developed are fond of acting and of imitating the gestures, voices, manners, and in general all the manifestations of man and animals. Its organ is situated at the front of the head, and on each side of benevolence.

22. Individuality is in Spurzheim's arrangement the first of those intellectual faculties which perceive the existence of external objects and their physical qualities. Its organ is situated behind the root of the nose, and its greater development enlarges the forehead between the eyebrows.

23. Configuration is the power which takes cognizance of forms and figures generally. Its organ is situated in the internal angle of the orbit, and when large it pushes the eyeball outwards and downwards, giving the person in whom it is thus developed a somewhat squinting appearance, and making his eyes appear unusually wide apart.

24. Size. This is the faculty which measures the size of bodies, as distinguished from their form, which is appreciated by the preceding power. Its organ is placed at the inner corner of the arch of the eyebrow.

25. Weight. It is believed that the mind estimates the weight and resistance as well as many of the other qualities of bodies, not by the sense of feeling, but by a peculiar internal operation, which must require a special organ. Dr. Spurzheim conjectures that its situation is behind the orbit, in the neighbourhood of configuration and size.

26. Colouring. There appears to be a peculiar faculty for the full appreciation of the relations of colour. The organ of this power, which must from these and other similar circumstances be regarded as an original faculty of the mind, is placed in the middle of the arch of the eyebrow.

27. Locality. This is the faculty by which we appreciate and remember the places occupied by objects around us; the mental power which makes the traveller, geographer, and landscape-painter; which recollects localities, and gives notions of perspective. Its organ is placed above and on each side of the root of the nose.

28. Calculation might be called the faculty of arithmetic; whatever concerns number or calculation belong to it, and hence Mr. Combe and many others speak of its organ as that of number. In those in whom the power of calculating is much developed, the external angle of the eyebrow is either much pressed downwards or elevated; the organ of this faculty being situated beneath that part of the brow.

29. Order. It is believed that there is a faculty which gives a disposition to arrange and put things in order. Its organ is situated between those of colouring and calculation.

30. Eventuality. Individuals who have this organ large are attentive to all that happens around them, to phenomena, to events, to facts; they are fond of history and of anecdotes; are inquisitive, and desire information on every branch of natural knowledge. The organ is situated in the middle of the forehead, and those in whom it is much developed have a peculiar prominence of this part of the skull.

31. Time. The faculty of time conceives the duration of phenomena, their simultaneousness, or succession. Its organ is situated above the middle of the eyebrow.

32. Melody or Tune. The organ of tune bears the same relation to the ears as that of colour does to the eyes. The organ is placed above the outer part of the eyebrow, so that when much developed, it enlarges the lower and lateral part of the forehead.

33. Language. This is the faculty which makes us acquainted with arbitrary signs, which remembers them, judges of their relations, and gives a disposition to indulge in all exercises connected with words. Its organ was the first that Dr. Gall discovered: in his youth he observed that while he had great difficulty in committing his lessons to memory, there were many boys who could easily learn by heart even things which they did not understand so well as he did. He noticed that all these boys were 'bull-eyed,' that is, had a peculiar prominence of the eye-ball, which seemed to project from its socket. Subsequent observation enabled him to confirm the

opinion that the organ of verbal knowledge is situated at the very back part of the orbit, which is, with the eye, pushed forward by it when it is much developed.

34. Comparison is the reflective faculty which compares the sensations and ideas excited by all the other faculties, and points out their difference, analogy, similitude, or identity. Its organ is situated in the middle of the upper part of the forehead.

35. Causality. The reflective faculty which engages men in the study of the causes and origins of things, and which guides to the employment of processes of induction, is thus named. The organ of causality is at the upper part of the forehead, on each side of comparison.

PHRO'NIMA, Latreille's name for a genus of minute *Amphipodous Crustaceans*, of parasitic habits, tenanting the interior of the bodies of *Pyrosoma*, *Medusæ*, &c. Examples, *Ph. sedentaria* and *Ph. custos*.

PHRO'SINE, M. Risso's name for a genus belonging to the second section of *Amphipodous Crustaceans*. Examples, *Ph. semilunata*, found near Nice, in deep water, on a sandy bottom; *Ph. macropthalma*, found by M. Risso, parasitic on *Pyrosama*. Both species are minute.

PHRYGIA, a country of Asia Minor. Under the early Roman emperors it was bounded on the W. by Caria, Lydia, and Mysia, on the N. by Bithynia, on the E. by Galatia and Cappadocia, and on the S. by Lycia, Pisidia, and Lycaonia. Before the establishment of the province of Galatia by the Gauls who invaded Asia Minor, Phrygia extended as far as the Halys. The northern part of Phrygia Proper was called Phrygia Epictétus, or the 'Acquired,' a name given to it when it was annexed by the Romans to the kingdom of Pergamos; and the southern part, which bordered upon Mount Taurus, was called Phrygia Paroreius from this contiguity.

Phrygia is a high table-land, supported on the south by Mount Taurus, and on the north by the high range of mountains which runs from west to east under the ancient names of Ida and Temnon in Mysia, and Olympus in the neighbourhood of Brusa. The southern and eastern parts are covered with salt marshes, rivers, and lakes, which have no visible outlet. The lake called Tatta by Strabo (now Tuzla) is 30 miles long, and supplies an immense quantity of salt.

The early history of the Phrygians is very obscure. They were conquered by Crœsus, and subsequently by Cyrus. They afterwards fell under the dominion of the successors of Alexander; and finally under that of the Romans.

In northern Phrygia was Azáni, near the source of the Rhyndacus, where there are now very extensive ruins; Cotyæum, now Kutaya; and the Phrygian Ancyra, the site of which appears to be doubtful. In the south-east part of Phrygia was Sýnnada, and in its neighbourhood Docimia, noted for its marble quarries. In the south-western part of the province was Celænæ, near the source of the Mæander; and Apameia Cibótus, a place of great wealth, and in the time of Strabo second only to Ephesus as a commercial town. South-west of Apameia was Colossæ, where there was a Christian church, to which St. Paul addressed one of his Epistles. West of Colossæ was Laodicea, a large commercial town in the time of Cicero; there was a Christian church here in the time of the Apostles. Nearly opposite to Laodicea, to the north of the river Lycus, was Hierápolis, which had mineral springs.

PHRY'NICHUS of Athens, the son of Polyphradmon, was a disciple of Thespis, and a writer of tragedy. He was upwards of twenty years the contemporary of Æschylus, and probably he was about so many years his senior. The first play of Phrynichus was exhibited B.C. 511. He made great improvements in tragedy, and he took his subjects from the graver parts of the mythology and history of his country. One of his tragedies, the 'Capture of Miletus,' which took place B.C. 494, is mentioned by Herodotus (vi. 21). His 'Phœnissæ,' exhibited in B.C. 476, won the prize. Phrynichus had only one actor, and no dialogue, at least until Æschylus introduced the dialogue; for Æschylus is said to have made this essential addition.

There was also an Athenian comic poet, named Phrynichus, who was living B.C. 430: and a lexicographer, Phrynichus, who lived between A.D. 17 and 190, and was the author of a kind of Greek Lexicon, entitled 'A Selection of Attic Verbs and Nouns.' The best edition is by Lobeck, 8vo, Leipzig, 1820.

PHTHISIS (a Greek word, *φθίσις*, signifying 'corruption,' 'decay') was formerly used as a generic term to signify a wasting or consumption from any cause, and was afterwards more distinctly specified, according to the organ in which it was supposed to originate; hence we had a *Phthisis Hepatica*, *P. Mesenterica*, *P. Pulmonalis*, &c.; but the word is now restricted to the disease produced by tubercles in the lungs, and commonly known by the name of *Consumption*. Of the morbid changes that occur in phthisis by far the most important and characteristic consists in the development of tubercles, and it is in the lungs that they first and most frequently manifest themselves. Tubercles of the lungs first appear in the form of small, gray, semi-transparent granulations, which gradually enlarge and become opaque in their centre: the opacity increases, till the whole mass becomes of a dull yellowish-white colour. After a certain time they soften, empty themselves into the bronchial tubes, and give rise to excavations more or less considerable. In this way, almost the whole of both lungs may be invaded by a succession of tubercles, their healthy structure being absorbed as the tubercles become deposited, or involved in the destructive process consequent upon their softening. Tubercles, almost invariably commence at the summit of the lungs, where, as well as being more numerous, they are usually found in a more advanced stage of development than in any other part.

The symptoms of phthisis generally commence with a slight cough, which at first excites no attention, but is regarded as a simple cold. The breathing is not seriously affected, nor is the appetite impaired. After a time the cough increases in

frequency, and is accompanied by expectoration of a clear frothy saliva: the breathing and pulse become a little hurried after meals and towards evening; and at this time of the day there is frequently experienced a slight degree of chilliness, followed by heat, which continues during the greater part of the night, and is succeeded towards morning by perspiration. The patient likewise becomes somewhat paler, and is languid and easily fatigued. In some instances the first symptoms are preceded by a more or less copious hæmoptysis. In the second stage of phthisis the cough becomes more frequent, especially during the night, and, if violent, it sometimes occasions vomiting; hoarseness, or loss of voice, is not unusual: the expectoration changes its character; it is less frothy, and more opaque, containing small particles of a yellowish curd-like substance; or the sputa are streaked with dull yellow lines; and hæmoptysis is pretty frequent, but in general not abundant; the breathing and pulse are more hurried: the fever is greater; and the perspirations more regular and copious: pains in the thorax, denoting pleuritic inflammation, often occur; and the languor and emaciation still increase. In the last stage of consumption there is nearly always profuse diarrhœa, and the sweats and expectoration are more copious: the latter becomes more uniform in composition, and is separated into roundish distinct masses, with flocculent edges. The emaciation and debility keep pace with the other symptoms; and the feet and ankles swell towards evening: the appetite generally declines in the same proportion, and the patient dies in the extreme degree of marasmus, not unfrequently flattering himself to the last with a speedy recovery. The symptoms of phthisis in their early stage are not unlike bronchitis. The dry cough and the frequent presence of hæmoptysis will lead to the conclusion that phthisis must be guarded against. Auscultation gives us little or no aid in the earliest stages of phthisis, and when the stethoscopic signs first manifest themselves, they are such as result from an increased density in the structure of the lung, and not from the presence of fluid in the bronchi, as is the case in bronchitis. Thus the expiration, which in health is scarcely audible, becomes more distinct; the voice more resonant; the sound elicited on percussion duller. These alterations in the respirations and in the signs produced by percussion, like the development of tubercles, take place from the summit to the base of the chest; and at first are almost constantly confined to the upper lobe of one side. In the more advanced stages of phthisis its diagnosis is less difficult, and is made from a consideration of the sputa, which we have already described, and from the signs furnished by percussion and auscultation. These are now decisive; the upper parts of the chest are dull on percussion; the respiratory murmur is strong, coarse, or even cavernous under the clavicles; and the voice listened to in the same situation gives rise to that peculiar phenomenon termed pectoriloquy. If there should be much fluid in the lungs, resulting from the patient's not having lately expectorated, we then have a mucous rattle in all those parts

of the chest corresponding with the seat of the disease; and where cavities containing fluid exist, the air passing through this produces that gurgling noise to which the term gargouillement has been applied by the French. The space in which these different changes take place is at first limited; but it daily increases, and in some instances, where the entire upper lobe of the lung is converted into numerous excavations, the respiration is coarse, and more or less tracheal throughout its whole extent.

Phthisis is much more frequently a chronic than an acute disease. The mean duration of 314 cases reported by Louis and Bayle was 23 months, including extreme cases; but 162, or more than half of the cases, terminated in 9 months; and the greater proportion of them between the fourth and ninth month. By excluding those cases of these authors which terminated within four months, and those that exceeded four years, the average duration is eighteen months. With regard to the mortality from phthisis, it varies in different climates, ages, sexes, races, and occupations. In England and Wales, according to the Reports of the Registrar-General of Births, Deaths, and Marriages, it is 19.55 per cent. of the total number of deaths, or 3.82 annually out of 1000 living. In France it is about the same. On the eastern frontiers of the Cape of Good Hope, where the atmospheric vicissitudes are sudden and great, the thermometer in summer sometimes varying, in the course of a few hours, from 110° to 64°, and in winter from 75° to 32°, it is only 3½.

The natives of some tropical climates seem so little subject to diseases of the lungs, that among 74,850 native troops serving in the Madras presidency, the deaths, by every description of disease of the lungs, did not, on the average of five years, exceed one per 1000 annually. The period of life at which the greatest mortality from phthisis occurs is between 20 and 40; but although the number of deaths from phthisis is more considerable from 20 to 40 than from 40 to 60, the general mortality is less in the first than in the second period. In respect of sex, consumption destroys more females than males, in the ratio of 4.155 to 3.771.

The causes of phthisis may be divided into the remote and the exciting, or those which induce the constitutional predisposition, and those which determine the local deposition of tuberculous matter after such predisposition is established. The one class of causes operates by modifying the whole system; the other, by determining in a system so modified the particular morbid action of which tuberculous matter is the product. Of the remote causes, or those which induce the constitutional predisposition, perhaps the most powerful is that which arises from hereditary transmission; not that an individual born of consumptive parents will himself necessarily fall a prey to the same disease, but only that, when exposed to the exciting causes, he will be more likely to become affected than one born of healthy parents. Next to hereditary transmission, a sedentary life, more especially when associated with a confined posture of the body and impure air, are, bad quality or in-

sufficient quantity of food; insufficient clothing; excessive mental or bodily labour; mental depression; and abuse of spirituous liquors. In fact, all those agents which operate in depressing or lowering the tone of the system generally act as remote causes in the production of phthisis. Of the exciting causes of phthisis none have been supposed to act more powerfully than irritants acting locally on the bronchial tubes or on the lungs, whether occasioned by inflammation of those parts or by the mechanical action of irritating bodies upon them. The result however of the latest investigations on this subject leave no doubt that the influence exerted in this way has been greatly exaggerated. A great proportion of the cases arising from this cause amongst people in workshops, may be attributed to a want of pure air. Dr. Lombard, whose researches are founded on a total of 4300 deaths from phthisis, and 54,572 individuals, exercising 220 different occupations, found, by a comparison of all the professions carried on in the open air and in workshops, that the proportion of deaths from phthisis was double among the latter; and this proportion increased as the apartments were close, narrow, and imperfectly ventilated.

The influence of smoke also, when uncombined with other agents of injurious tendency, may, we think, fairly be called in question, as it is not always the most smoky towns that furnish the largest number of phthisical cases.

A moist and changeable climate has been regarded hitherto as among the most active causes of consumption; and Great Britain, whose climate combines these two conditions in a remarkable degree, has been looked upon as a nursery for phthisis. It does not however appear that the population of Great Britain is more liable to consumption than other countries of Europe. There is even some evidence to prove that very changeable and very moist districts are most free from consumption.

Of all the exciting causes of consumption, there is no doubt that the want of a pure atmosphere is the most potent. Just in proportion to the confinement of a population in ill-ventilated rooms or workshops, has been found its liability to consumption. The neglect of ventilating sitting-rooms, and more especially bed-rooms, is undoubtedly one of the great sources of consumption amongst the middle and upper classes of society.

Treatment of Phthisis.—This resolves itself into two kinds: first, the *prophylactic*, or that which has for its object the prevention of phthisis in those who are hereditarily or otherwise predisposed to the disease; and secondly, the *curative*, or that which endeavours to arrest its progress after tubercles have manifested themselves. Much may be done in the first case; but experience proves the limited control that we possess over it in the second.

The most obvious prophylactic treatment is to avoid all those causes which produce the tuberculous diathesis. Marriages should be made with regard to the health of the contracting parties. Children, especially if sickly, should be reared and educated with less anxiety about their mental progress than their bodily strength. Those professions and trades should be avoided which combine much sitting, with a confined posture of body, as those of tailors, shoebinders, shoemakers, milliners, lacemakers, engravers, jewellers, watchmakers, clerks, &c., all of whom are peculiarly subject to phthisis. All occupations that are carried on in the open air should be chosen in preference to those of an opposite kind. Sleeping-rooms and sitting-rooms should always be kept warm and thoroughly ventilated. Callisthenic exercises, when indulged in with moderation, are healthful, and should by no means be neglected. In short, everything which tends to invigorate the body diminishes disease; and it is proved by statistical facts, that wherever the mortality from disease generally is low, the mortality from phthisis is also low. The curative treatment of phthisis consists in regulating the health generally, and in combating particular symptoms. For the attainment of the first object, the diet should be nutritious, but not stimulant; and the exercise regular, but gentle, and not too much prolonged. Of modes of travelling, sea-voyages are perhaps the most beneficial; and where much improvement has taken place during the voyage, it would be better to repeat it than hazard the doubtful benefit of a residence on land. The influence of climate on consumption, we are inclined to believe, is imperfectly understood. It has been laid down as a general principle, that the change from a variable temperature to one of an opposite description is in the highest degree advantageous, and, *cæteris paribus*, we think this may safely be admitted; but in recommending patients to go to climates which possess this uniformity of temperature, it has been too often overlooked that there are other counteracting circumstances which more than neutralise this advantage. The practice of sending patients to a foreign country who are in the last stage of consumption cannot be too strongly reprobated. Where circumstances render removal to an anti-phthisical country impossible, confinement to apartments where the heat is regulated, and the purity of the air as much as possible preserved, during the more rigorous weather of this climate, may be recommended.

Various medicines have been given in this disease, but none have had the effect of curing it. In the earlier stages, tonics are very useful; but with regard to emetics, naphtha, Prussic acid, inhalation of iodine, Iceland moss, henbane, hemlock, and other remedies, they can none of them be relied on. Opium is useful to allay the cough; mineral acids to restrain the perspiration. The liquor potassæ is a valuable sedative. Above all, cod liver oil, although its curative power may be doubted, has undoubtedly suspended the disease for a greater length of time than any other remedy or course of treatment.

PHULWA, or the *Vegetable Butter of Almora*, is the produce of the Chooree, or Butter-Tree (*Bassia butyracea* of botanists) of Kumaon, in Hindustan, in the eastern district of which it grows. It is peculiarly abundant in the province of Dotee, where the butter forms an article of commerce. Hence, in its crude state, it

is cheaper than ghee (clarified butter), and is used to adulterate that article. It answers well for lamps, burning with a bright flame, neither the smell nor the smoke being so great as those of oil.

PHYLLIDIANS, Lamarck's name for a family of *Gastropodous Mollusks*, including, according to his views, the genera *Phyllidia*, *Chitonellus*, *Chiton*, *Patella*, *Patelloidea*, and *Siphonaria*.

PHYLLO'DIUM is that organ which in the greater part of the New Holland Acacias, or Wattle-Trees, stands in the place of leaves.

PHY'LLODOCE, a genus of plants belonging to the natural order *Ericaceæ*. The species are small evergreen shrubs, natives of the north of Europe, Asia, and North America. *P. cærulea* is native of Perthshire and the north of England. There are three other species of *Phyllodoce*, which are natives of North America.

PHYLLO'PODA, Latreille's name for a section of crustaceans which have the head confounded with the trunk; the eyes sessile, smooth, and closely approximated; a delicate buckler formed of a single piece, and free posteriorly, serving as a crust or shell; two horny demi-cylindrical mandibles, with a compressed, straight, and very dentilated point, but without palps; first pair of feet in the form of oars, and terminated by articulated bristle-like appendages; the others branchial, and more than sixty (pairs) in number, disposed for swimming.

The genus *Apus* of Scopoli (*Binoculus*, Geoffr., Leach; *Limulus*, Mull., Lam.; *Monoculus*, Linn., Fabr.) will serve as an example of the *Phyllopoda*.

PHYLLOSO'MA. The family of *Double-Cuirassed Crustaceans* (*Bicuirassés*), is composed of forms which are very remarkable for their rounded shape and the transparency of their teguments. The carapace is large, lamellar, extended like a leaf horizontally above the base of the antennæ and a more or less considerable portion of the thorax. The thorax is equally depressed, so as to resemble a thin blade or plate placed horizontally, and to the existence of these two bucklers, so to speak, they owe the name (*Bicuirassés*) given to them by Latreille.

M. Milne Edwards regards this family as consisting of two genera only, *Phyllosoma* and *Amphion*. He observes that the *Phyllosomata* are easily recognised by their foliaceous carapace, which leaves part of the thorax exposed. In *Amphion*, the carapace hides the thorax entirely.

Geographical Distribution of the Genus.—The seas of warm countries. M. Milne Edwards remarks, that were it not for the beautiful blue of their eyes, they would not be perceived as they float on the surface of the water, so transparent are their bodies. The seas of Africa and India, New Holland, and New Guinea, furnish the greatest number of species. *Phyllosoma Mediterranea* appears to have been the only European species known, till Mr. F. C. Lukis noticed another of these remarkable crustaceans in the 8th volume of Loudon's 'Magazine of Nat. Hist.' Since the publication in Loudon, Mr. Lukis has confirmed the presence of the species on the shores of the Atlantic by another specimen taken at Guernsey, and he proposes for it the name of *Phyllosoma Sarniense*.

The species are very numerous, and exhibit differences in their organisation so great, that M. Milne Edwards thinks it will be probably necessary hereafter to establish many generic divisions for these forms; but, as he cautiously and philosophically observes, until the modifications of structure dependent upon sex and age are known, the value of those differences cannot be well appreciated.

PHY'SALIS, a genus of plants belonging to the natural order *Solonaceæ*. *P. somnifera* has a red smooth berry about the size of a pea, reputed to be narcotic, diuretic, and alexipharmic. The leaves steeped in oil are in India applied to inflammatory tumours, and they are used in a similar way in Egypt. Kunth recognised this plant in Egyptian mummies. *P. Alkekengi*, the Winter Cherry, is a native of Europe on exposed hills, and of Japan. The corolla is a dirty white; the calyx reddish yellow, enclosing a red berry. In this country the fruit is seldom eaten, and the plant is cultivated chiefly on account of its appearance. In Arabia and Armenia, Spain and Germany, however, the berries frequently supply the place of other eatable fruits. *P. pubescens*, Downy Winter Cherry, is a native of North America and the East Indies. The whole plant is densely clothed with down. The berries are yellowish when ripe; they are called gooseberries, and are used as a substitute for them in many parts, and when preserved with sugar make an excellent sweetmeat.

PHYSIC NUT, the colonial name of the nut of the *Jatropha Curcas*, an East Indian plant, whose seeds are employed by the natives as a purgative.

PHYSICIAN. The first class of medical practitioners in rank and legal pre-eminence is that of the physicians. They are (by statute 32 Henry VIII.) allowed to practise physic in all its branches, among which surgery is enumerated. But at present the practice of the physician is universally understood, as well by physicians as the public, to be properly confined to the prescribing of medicines, which are to be compounded by the apothecaries; and in so far superintending the proceedings of the surgeon as to aid his operations by prescribing what is necessary to the general health of the patient, and for the purpose of counteracting any internal disease.

In the universities of Oxford and Cambridge the degrees of Bachelor of Medicine and Doctor of Medicine are conferred, after the candidate has complied with all the requisite terms.

Since the University of London has been chartered, in 1837, the degrees of Bachelor and Doctor of Medicine, among others, have been also conferred there. The regulations under which these degrees are conferred are printed in the 'London University Calendar.'

In Scotland the degree of Doctor of Medicine is conferred by the universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews, from which last-named university a diploma can still be obtained without residence.

In Ireland the King and Queen's College of

Physicians exercise much the same authority as the English College of Physicians. The degrees of Bachelor and Doctor of Medicine conferred by Trinity College, Dublin, rank with the same degrees respectively from Oxford and Cambridge.

A physician is exempted from serving on juries, and various offices, and from bearing arms. He is responsible for want of skill or attention, and is liable to have an action brought against him by a patient who may have suffered injury by any gross want of professional knowledge on his part.

The fee of a physician is honorary, and it cannot be recovered by an action at law.

PHYSICIANS, ROYAL COLLEGE OF, was founded through the instrumentality of Linacre, who obtained, by his interest with Cardinal Wolsey, letters patent from Henry VIII., dated in the year 1518. This charter granted to John Chambre, Thomas Linacre, Ferdinand de Victoria, Nicholas Halsewell, John Francis, and Robert Yaxley, that they, and all men of the same faculty of and in the city of London, should be in fact and name one body and perpetual community or college; and that the same community or college might yearly and for ever elect and make some prudent man of that community, expert in the faculty of medicine, president of the same college or community, to supervise, observe, and govern for that year the said college or community, and all men of the same faculty, and their affairs, and also that the president and college of the same community might elect four every year, who should have the supervision and scrutiny, &c., of all physicians within the precincts of London. The statute of 14 Henry VIII. confirmed this charter, and further ordained, that the six persons above named, choosing to themselves two more of the said commonalty, should from henceforth be called and cleaped elects; and that the same elects should yearly choose one of them to be president of the same commonalty; and then provided for the election of others to supply the rooms and places of such elects as should in future be void by death or otherwise, which was to be made by the survivors of the same elects. The statute of 32 Henry VIII. provides that from henceforth the President, Commons, and Fellows might yearly, at such time as they should think fit, elect and choose four persons of the said Commons and Fellows, of the best learned, wisest, and most discreet, such as they should think convenient, and have experience in the faculty of physic, to search and examine apothecaries' wares, &c. This last appointment is independent of the constitution of the body, the persons so appointed being officers for a special purpose; and it has been usual to select for this office the same four persons in whom the government of the physicians is reposed by the charter and statute of the 14th of Henry VIII.

The constituted officers then of this corporation are the eight elects, of whom one is to be president, and four governors, who have generally borne the name of censors.

The licentiates of the college who may practise within the precincts of London and seven miles round, it were (until 1836) of three orders, viz., Fellows, Candidates, and mere Licentiates. The last of these classes, generally denominated Licentiates, are those who have only a licence to practise physic within the precincts above described. The second class was abolished in 1836. The first class are those who have received that licence, but whose licence also shows that they are admitted to the order of Fellows. This licence has often been called a *Diploma*, but as it confers no degrees, the word is not properly applied, according to its more strict signification.

The order of Candidates was abolished in 1836, as above stated, but there were reserved to students then in the universities of Oxford and Cambridge their *inchoate* rights.

The order of Fellows comprises those who are admitted into the fellowship, community, commonalty, or society of the college. The charter incorporated all physicians then legally practising in London, so that each of them who thought proper to accept it became *ipso facto* a member or fellow; but as all future practitioners, within the precincts of and seven miles round that city, were required to obtain the licence of the college, there soon arose two orders of the profession. The Fellows attempted by various by-laws to limit their own number; but seem to have considered the Licentiates as members of the college, or the commons, and themselves as forming a select body for the purpose of government.

Regulations of the Royal College of Physicians of London.—Every candidate for a diploma in medicine, upon presenting himself for examination, shall produce satisfactory evidence, 1, of unimpeached moral character; 2, of having completed the twenty-sixth year of his age; and, 3, of having devoted himself for five years, at least, to the study of medicine.

The course of study thus ordered by the college comprises:—

Anatomy and physiology, the theory and practice of physic, forensic medicine, chemistry, materia medica, and botany, and the principles of midwifery and surgery.

With regard to practical medicine, the college considers it essential that each candidate shall have diligently attended, for three entire years, the physicians' practice of some general hospital in Great Britain or Ireland, containing at least one hundred beds, and having a regular establishment of physicians as well as surgeons.

Candidates who have been educated abroad will be required to show that, in addition to the full course of study already specified, they have diligently attended the physicians' practice in some general hospital in this country for at least twelve months.

Candidates who have already been engaged in practice, and have attained the age of forty years, but have not passed through the complete course of study above described, may (under special circumstances to be judged of by the Censors' Board) be admitted to examination upon presenting to the censors' board such testimonials of character, general and professional, as shall be satisfactory to the college.

The first examination is in anatomy and physiology. The second includes all that relates to the causes and symptoms of diseases. The third relates to the treatment of diseases.

The three examinations are held at separate meetings of the Censors' Board. The *vivâ voce* part of each is carried on in Latin, except when the board deems it expedient to put questions in English, and permits answers to be returned in the same language.

At the commencement of each oral examination, the candidate is called on to translate *vivâ voce* into Latin a passage from Hippocrates, Galen, or Aretæus; or, if he declines this, he is, at any rate, expected to construe into English a portion of the works of Celsus, or Sydenham, or some other Latin medical author.

In connexion with the oral examinations, the candidate is required, on three separate days, to give written answers in English to questions on the different subjects enumerated above, and to translate in writing passages from Greek or Latin books relating to medicine.

The qualifications required for Extra-Licentiates, *i. e.* persons approved for practising physic out of the city of London and seven miles thereof, pursuant to statute 14 & 15 Henry VIII. chap. 5, sect. 3, are the same as those above stated for Licentiates or Members.

Those who are approved at all the examinations receive a Diploma under the common seal of the college.

These regulations are not strictly adhered to; the *vivâ voce* examination for instance being mostly in English, arising from the inability of either examiner or candidate to speak Latin. Though possessed of legal powers the College has for many years ceased to use them, and a great number of physicians practise in London and the country without its licence. In consequence of the provisions of its charters being ill adapted to the wants of the profession at the present day, it has applied for a new charter, in which it is proposed to reconstruct the whole of the arrangements of the College, and to adapt it to the demands of the present state of the practice of medicine in Great Britain.

PHYSICS. The word *physike* (φυσική), or science of nature, might include in one general term all that is called mixed mathematics, natural philosophy, chemistry, and natural history. The title of physician, or student of nature, has become in our language synonymous with one who investigates the origin of diseases and the means of cure; but in the continental languages it still retains the more general signification. Also physic (the study of nature) has come to mean the drugs given to cure disorders, or medicines; and it would be difficult to name two more complete departures from etymology.

The plural physics is always used to mean the study of nature by means of the severer modes of investigation. Some apply it to the application of mathematics to material phenomena, and to this alone; others, distinguishing the preceding as mathematical physics, include under the general term the sciences of experiment. There is no usage which in any degree approaches a universal reception. We prefer the second-mentioned signification.

PHYSIOGNOMY (φυσιογνωμονία) is the art of determining the mental character of an individual by the examination of his countenance. The circumstance on which the chief and surest indications afforded by the countenance depend, is, that when certain feelings or habits are much indulged in, the positions of the features which are associated with them are apt to become permanent. Thus a person in the frequent habit of sneering contemptuously acquires at last a slight curve in his upper lip by the disproportionate size and power of its elevator muscle; he who is often meditating has the slight frown and the contraction of the brows which are commonly associated with deep thought, permanently fixed; he who has his attention constantly alive to the objects around him acquires an expression of vivacity in the openness of his eye and the quickness of the motions of all the muscles of his face; while he, on the other hand, whose thoughts are rarely roused to active efforts, acquires a smoothness of feature and a sluggishness of action in the several parts of the face, which indicate that its muscles have been exercised as rarely and with as little energy as his thoughts. The attempts to raise physiognomy into a science have not been so successful as to encourage a deeper study of it than every one unconsciously engages in during his intercourse with the world.

PHYSIOLOGY (φυσιλογία, from φύσις, nature, and λόγος, discourse) is the science which treats of the phenomena of living bodies. Its several departments are considered in separate articles, such as LIFE, DIGESTION, ABSORPTION, CIRCULATION OF THE BLOOD, NUTRITION, BONE, SKELETON, ARTICULATION, MUSCLE, LARYNX, NERVE, BRAIN, HEART, &c.

PHYSO'GRADA, a family of marine gelatinous animals, remarkable for the beauty of their tints, and the inflation of their body, from which numerous fibrils or tentacles depend. So delicate is their structure that their preservation in spirit cannot be effected, as they become changed by contraction, and lose their natural appearance. [ACALEPHÆ.]

Examples.—*Physalia Arethusa, Physalus Pelagious* of Lamarck—the Portuguese Man-of-War of English voyagers. This species is a native of the warmer latitudes of ocean, where it floats in congregated multitudes, delighting the eye of the voyager with its beautiful colours; occasionally a few stragglers are driven into the bays of our south-west coast. Their tentacles produce an intense sensation of stinging and subsequent aching in the fingers to which they are applied; this pain extends up the arm, and affects the joints of the elbow and shoulder, and even the muscles of the chest. (For an excellent history of the *Physalia*, see Bennett's 'Wanderings,' vol i., p. 5 et seq.)

Among other genera we may mention *Physsophora, Diphysa, Rhizophysa, Stephanomia, Protomedea*, and *Rhodophysa*.

PHYSOSPERMUM, a genus of plants belong-

ing to the natural order *Umbelliferæ*. The species are perennial herbs, the flowers white. *P. Cornubiense* is native of Cornwall, in bushes and hedges, in great plenty in the neighbourhood of Bodmin. The root contains a yellow resinous juice. There are few species of this genus.

PHYTEUMA, a genus of plants belonging to the natural order *Campanulaceæ*. *P. orbiculare*, Round-Headed Rampion, is native of the mountains of Europe and of England in chalky soil. The flowers are of a deep blue colour. *P. spicatum*, Spiked Rampion, is native of the temperate parts of Europe, and of Sussex, in England. All the species are hardy and well fitted for garden borders or rockwork.

PHYTOLACCA, a genus of tropical or subtropical herbaceous plants, with erect or occasionally twining stems. *Phytolacca decandra*, a species found wild in Virginia, has a root which acts as a powerful emetic, but its exhibition is attended with narcotic effects: its berries are also reported to possess the same quality; they stain an intense purple colour, and are said to be employed in Portugal as a means of improving the appearance of inferior red wines.

PHYTOLACCACEÆ form a small natural order of plants. According to most writers they are regarded as apetalous plants and allies of the Chenopodiaceous and Polygonaceous orders, from which their distinct ovaries chiefly distinguish them. With the exception of *Phytolacca*, no plants of this order appear to be of much importance to man. Their properties seem to be generally acrid.

PHYTOZOA'RIA. This is the general term employed by M. Ehrenberg to include the numerous species and genera of minute animals living in water, for which by other writers the titles of *Infusoria* and *Microzoaria* are preferred. There are two grand divisions, or classes as Ehrenberg calls them, of the *Phytozoaria*, viz. *Polygastrica* and *Rotatoria* or *Rotifera*.

PIA MATER. [BRAIN.]

PIACENZA (*Placentia*), a town in the duchy of Parma, is situated about half a mile from the southern bank of the Po, and two miles east of the confluence of the Trebbia with that river, in a fine plain bounded on the south by well-cultivated hills. The town is surrounded by walls and ditches, and has a citadel. The streets are wide and straight. The principal square in front of the ducal palace is adorned with two equestrian bronze statues of dukes Ranuccio and Alessandro Farnese. Piacenza abounds in fine buildings, the principal of which are—the ducal palace, commenced after the design of Vignola, but not finished; the Podesteria, or town-house, a gothic building of the 13th century; the cathedral, a handsome gothic structure of the 12th century; San Sisto, a handsome church, richly adorned; the fine church of San Agostino; and Santa Maria di Campagna, which has some fine paintings. The new theatre, and the school of design and architecture, are also worthy of notice.

Piacenza contains 25,000 inhabitants, who carry on a considerable trade in the agricultural products of the country. The establishments for public instruction consist of a superior school, or lyceum, with professors of law and medicine; a secondary or grammar school, the college Alberoni for boarders, a school of the fine arts, an institution for the education of young ladies, and several elementary schools for boys and girls.

Placentia was a Roman colony in 224 B.C. It was taken and destroyed by Hamilcar after the second Punic war, but was afterwards restored by the Romans. In modern history Piacenza is mentioned as one of the independent Lombard cities. It afterwards had its lords of the families of Pallavicino, Scotti, and Landi. It next fell under the dominion of the Visconti, dukes of Milan. After the death of Filippo Maria Visconti, A.D. 1447, and the establishment of an ephemeral republic at Milan, the citizens of Piacenza revolted against the Milanese, and placed themselves under the protection of Venice. But Francesco Sforza, being appointed commander of the Milanese, retook Piacenza, in December, 1447, when the town was given up to pillage. From that time Piacenza remained subject to the Sforza, dukes of Milan; was taken by the French under Louis XII., and retaken from the French by Pope Julius II.; after which it remained subject to the popes, together with Parma, until 1545, when Pope Paul III. gave it to his son Pier Luigi Farnese. From that time it has formed part of the duchy of Parma.

PIAHAU, or PIAUHAU, the name assigned to certain Cotingas (*Ampelis*, Linn.), whose bill is more strong and more pointed than the ordinary Cotingas. The Piauhaus are so called from their cry, and are very insectivorous. Vieillot has distinguished them by the generic name of *Querula*. [MUSCICAPIDÆ.]

PIAUHY. [BRAZIL.]

PIANO-FORTE, a keyed musical instrument, variously formed and under different denominations, such as *grand*, *square*, *semi-grand*, *cabinet*, *cottage*, and *piccolo*. The first notion of the square piano-forte was taken from the clavichord by a German mechanic of the name of Viator, about a hundred years ago; but, for want of friends or funds, he never became known as a maker. The invention however was followed up by other musical instrument makers of the same nation, who all left their clavichords and harpsichords for the new instrument, the piano-forte.

The Grand Piano-Forte is supposed to be of earlier date than the square piano-forte, and is said to have been the invention of a German musician of the name of Schröder, or, as others say, of Christofali, a harpsichord-maker of *Padua*. The first maker at all known in this country was a German of the name of Backers, but we are not aware that success attended his exertions in comparison with the solid advantages which were enjoyed by his contemporary Zumpe, who realised an ample fortune, and retired.

The grand piano-forte retains the shape of the instrument from which it was taken, the harpsichord. Here we have two instruments alike in form, but unlike in almost every other circumstance; for their action, their tones, and the style in which they are played upon, are all

entirely different. The action of the harpsichord was simply a key and what was called a *jack*, which was a piece of pear-tree with a small moveable tongue of holly, through which a cutting of crow-quill was passed to touch the string when the jack was in action; the tone produced by this contrivance was a kind of scratch with a sound at the end of it.

The action of a grand piano-forte consisted of a *key*, a *lever*, a *hammer*, a *button*, a *check*, and a *damper*, with rails and sockets to connect them. By this combination of parts, every musical intention known or desired at that time was perfectly attainable, and with admirable effects by Mozart, Haydn, Cramer, and others. But modern music requires greater powers in the instruments; and for the last half century, the Broadwoods, Erards, Collards, and other celebrated makers have introduced a succession of singular and most delicate contrivances, to give all possible perfection to the tones and the means of their production.

The Square Piano-Forte was taken from the clavichord, but it retains only its shape, with the same disposition of the strings and keys: their actions have no similarity. It may be necessary to state that the 'action' of a piano-forte is the technical name for the whole of the mechanism which intervenes between the pressure on the key and the striking of the string. The action of the clavichord was simply a piece of brass pin wire, which was placed vertically at a point where it could be struck or pressed against its proper string, the right-hand division of which was free to vibrate, whilst the left-hand was muffled by a piece of cloth, the object of which was to damp or stop the string, which it did the instant the finger was taken off the key. The touch of the clavichord was peculiar, partaking both of the harpsichord and the organ; in other words, both *struck* and *pressed*, and the pressure could be so varied as to produce a kind of tremblant effect. The tones were feeble, soft, and melancholy, and better suited to the student, the composer, or the solitary, than any purposes of social amusement.

The action of the square piano-forte, on its first introduction, consisted of a *key*, a *lifter*, a *hammer*, and a *damper*. The key was the same as that of the clavichord. The lifter was a brass wire, with a piece of hide leather as a head, which was covered with a piece of soft leather as a finish. This lifter, when in motion, struck the hammer against the string, and thus produced the tone of the instrument. The damper followed the performer, and stopped the vibrations as quickly as the finger was removed from the key. The tone of this piano-forte was thin and wiry, the hammer having only one slight covering of sheep-skin leather upon it. The subsequent improvements in the square piano-forte down to the present day, have consisted chiefly in the application of sundry small pieces of mechanism, called the *hopper*, the *under-hammer*, and the *check*, to improve the tone.

Some piano-fortes have seven octaves; but the usual number in the best instruments is six and a half; in others six, or five and a half. The strings of the early piano-fortes were partly of steel and partly of brass, the treble notes of steel, and the lower notes of brass; a few of which, in the bass, were over-lapped or covered, rather open, with plated copper-wire to give them more gravity according to the length attainable in the instrument. But modern piano-fortes have steel wire throughout, with about an octave in the bass closely lapped with unplated copper wire. The strings which are now used in piano-fortes are considerably larger than those which were formerly used; the advantages of which are durability and firmness. Almost all the wire employed for this purpose in England is made by one firm near Birmingham: it requires especial care in the manufacture. *Stops* and *pedals* are used in various degrees in piano-fortes; the stops are moved by hand, to alter the position of the dampers used against the strings; the pedals are moved by the feet for an analogous purpose.

The Upright Piano-Forte was, doubtless, taken from the upright harpsichord; it was invented by Mr. Hancock. The next novelty was the invention of Mr. Hawkins, who constructed an upright instrument with a detached sound-board in an iron frame, and the whole was so arranged as to be able to meet the atmosphere with compensating powers. In the bass, it had spiral or helical strings, by which length was gained; and, in the treble, three octaves of equal tension were accomplished by a uniform size of wire. The Cabinet Piano-Forte and the Piccolo Piano-Forte were two other forms in which the strings were placed vertically: the minor changes in these two varieties have been very numerous.

PIASTRE. [MONEY.]

PIAZZA, a term adopted in its original form from the Italian, but with a great change of its meaning; for while in that language it signifies merely an open place, it is employed by us to denote a covered ambulatory, whether formed by columns or arches, in the lower part of a building; such cloistered walks being very common in the *piazze*, or public squares, of Italian cities, as that of St. Mark's at Venice, &c.

PIAZZE'TTA, GIOVA'NNI BATTISTA, born at Venice in 1682 or 1683, was first instructed in design by his father, Jacopo Piazzetta, a carver in wood. He was taught painting by Molinari, but he acquired his style in Bologna from the works of Spagnoletto and Guercino. Piazzetta is one of the *Naturalist* school of painting, and he is one of the darkest of those who are sometimes called *Tenebrosi*: they generally painted on dark grounds. He died at Venice in 1754. His masterpiece is considered the Beheading of John the Baptist, at Padua. He excelled in caricature. Many of his works have been engraved.

PIAZZI, JOSEPH, was born at Ponte in the Valteline (Switzerland), July 16, 1746. He was educated at Milan and Turin. To escape religious persecution he accepted a professorship at Malta. Upon his return to Italy, he became professor of philosophy and mathematics in the College of the Nobles at Ravenna; but here again his religious opinions made him many enemies. Soon after the publication of two philosophical theses, which were deemed 'too bold for so young a

divine,' he found it expedient to retire, first to Cremona, and thence to Rome, where he was for some time reader of dogmatic theology at S. André della Valle. In 1780, at the recommendation of Jacquier, he was appointed professor of the higher mathematics in the Academy of Palermo, where, with the co-operation of the viceroy, he founded an astronomical observatory. In 1787 he visited Paris, where he made the acquaintance of Lalande, Jeaurat, Pingré, Delambre, and Bailly; also of John Cassini, Mechain, and Legendre, who were at that time occupied in determining the difference of longitude between the observatories of Paris and Greenwich. He next visited England, where he became intimate with Maskelyne, Herschel, Vince, and more particularly with Ramsden, to whom he confided the construction of the instruments for his new observatory. He returned to Sicily in the latter part of the year 1789, and very soon after became one of the most active and accurate of modern observers. In the course of the first ten years he determined the positions of 6748 stars. His first catalogue was published in 1803, under the title of 'Stellarum Inerrantium Positiones.' It was while thus occupied that he discovered, January 1, 1801, the first of the planets now known to be situated between the orbits of Mars and Jupiter, and to which he gave the name of Ceres.

In 1814 he published his Celebrated Catalogue of 7646 stars. Speaking of this Catalogue, the council of the London Astronomical Society remark, in their seventh annual Report, that 'it exceeds everything of the kind which preceded it, and shows more powerfully than words can express what may be effected by the talents and assiduity of one individual.' Piazzi died at Naples, July 22, 1826. His library and instruments he bequeathed to the observatory of Palermo, and a liberal annuity in perpetuity, to be appropriated in succession to the education and maintenance of young men who evince a marked partiality for astronomical science.

PICA. [Corvidæ.]

PICAMAR, a peculiar compound obtained from wood-tar. It is nearly colourless, limpid, and transparent; it has the consistence of a thickish oil; to the touch it is greasy; its smell is not very strong or disagreeable, but it is peculiar; the taste is intolerably bitter, and at first burning, but afterwards cooling, like peppermint.

PICARD, JEAN, was born July 21, 1620, at La Flèche in the present department of the Sarthe, and became priest and prior of Rille in the same department. Scarcely anything is known of his early history. The earliest event with which his name is associated, and of which the date is recorded, is the solar eclipse of August 25, 1645, which he observed with the astronomer Gassendi, whom he succeeded, in 1655, as professor of astronomy in the College Royal of France. He was one of the eight individuals selected by Colbert, in 1666, to originate the Academy of Sciences. The following year he made his first application of the telescope to the measurement of angles; prior to this, plain sights only had been used. Soon after this he introduced an entirely new system of astronomical observation, wherein the pendulum, then recently invented by Huyghens, is first brought into use in determining the right ascension of the stars by noting the instant of their passage across the meridian. In the Memoir wherein these views are more fully developed, and which he read before the Academy of Sciences, in April, 1670, he urges the necessity of forming more correct tables of the sun and fixed stars, as also tables of refraction. For this purpose he solicited the erection of a mural quadrant, which after many years of needless delay was finally adjusted in the plane of the meridian, not however till Picard was upon his death-bed. The observatory of Paris, the plan of which had been furnished by Picard, was completed in 1671, when it was immediately occupied by Dominic Cassini, who, at Picard's recommendation, had been invited by Colbert to take up his residence in France. It was not till two years later that inferior accommodation within the same building was allotted to Picard. 'He saw,' says Delambre, 'all his projects neglected or their execution deferred; all expenditure and encouragement lavished upon objects of less utility, though to the eye of the vulgar of a more brilliant character, such as the rotation of the three planets, and the four new satellites of Saturn; while telescopes of great cost were imported from Italy to verify these discoveries, which, though certainly very curious, were and always will be useless.' The astronomical ephemeris entitled 'La Connaissance des Temps,' originated with Picard in 1679, and was continued by him till his death. The same year he was nominated with Lahire, by the king, to conduct certain surveys along the coast of Gascony, the result of which sufficiently indicated the necessity of constructing an entirely new map of the country. For this purpose he proposed the extension of the arc of the meridian passing through the Paris observatory as far as the extremities of the kingdom: a proposal which has since been carried into effect.

What Picard is however now chiefly remembered for is his measurement of an arc of the meridian of Paris between Amiens and Malvoisine. This was begun in 1669, and forms the subject of his work, entitled 'Mésure de la Terre,' Paris, 1671. Newton, in 1666, failed to establish the truth of his theory of gravitation by employing an erroneous measure of the earth's radius, and did not resume its consideration till he heard of Picard's survey, by which it was confirmed.

Picard died at Paris, July 12, 1682 (Delambre): according to other authorities his death took place in 1683 or 1684.

PICARD, LOUIS BENOIT, member of the French Academy, and one of the cleverest and most successful dramatists of his age, was born at Paris, in 1769. His first production for the stage was 'Le Badinage Dangereux,' followed by a very long succession of comedies, which have earned for him from some the title of the Molière of his day. Among his pieces in verse, 'Mediocre et Rampant,' 'Le Mari Ambitieux,' and 'Les Amis de Collège,' are generally considered his best; while

the 'Contrat d'Union,' 'La Petite Ville,' and 'Les Marionettes' are regarded as his master-pieces among those in prose. He likewise wrote the 'Gil Blas de la Révolution,' and several other novels which met with considerable success. In addition to these various labours with his pen, Picard was at one time a performer at the Théâtre Louvois, and from 1801 director of that theatre. He was afterwards successively manager of the Opera and the Odeon theatre. He died Dec. 31, 1828.

PICARDIE, LA, a former province of France, was bounded N. by Artois and French Flanders, E. by Champagne, S. by Ile-de-France, W. by Normandie and the English Channel. The present department of Somme, the arrondissements of St.-Quentin and Vervins, in the department of Aisne, and those of Boulogne and Montreuil in the department of Pas-de-Calais, made up the province of Picardie. Amiens was its capital.

PICART, ETIENNE (called Le Romain, the Roman), a celebrated French engraver, was born at Paris in 1631, and died at Amsterdam in 1721. His prints are very numerous: they are firmly executed, but want harmony. He worked with the graver and the etching needle, much in the style of Poilly. He was engraver to the king of France, and a member of the French Academy of Painting, &c.

PICART, BERNARD, the son of Étienne Picart, born at Paris in 1663, was a designer and also a distinguished engraver, and superior to his father. He was the pupil of Le Clerc. His best works are those executed in France; in Amsterdam he worked exclusively for the booksellers, and became mannered, metallic, and merely ornamental. He had a facility in imitating the styles of other earlier engravers, and he published many prints of this class which are said to have deceived collectors. His prints altogether amount to about 1300. One of the best of them is a Slaughter of the Innocents, after a design of his own. He died at Amsterdam in 1733.

PICCI'NI, NICOLO, was born at Bari, in the Neapolitan territories, in 1728. He studied at the Conservatorio Santo Onofro, and brought out his serious opera 'Zenobia,' at the theatre of San Carlo, Naples, in 1756. This led to his being invited to Rome, where he produced his masterpiece, 'La Buona Figliuola.' In 1776 he went to Paris, where he was appointed singing master to the queen, and was afterwards chosen director of L'Ecole de Chant. The storms of the revolution drove him back to Naples, where however his own liberal opinions led him into disgrace, and even danger. In 1798 he returned to Paris, where the First Consul appointed him inspector of the 'Conservatoire de Musique,' and allowed him a pension. Piccini died in 1800. Besides a multitude of miscellaneous pieces, he is said to have composed in the space of a very few years no less than 134 operas.

PICCOLOMINI. [PIUS II.]

PICE'NUM. [MARCA D'ANCONA.]

PICHEGRU, CHARLES, was born of humble parents, in 1761, at Arbois in Franche-Comté. He studied at the College of Brienne, enlisted as a common soldier, and accompanied his regiment to America. He embraced the principles of the Revolution, and in 1793 commanded the Army of the Rhine. In 1794 he succeeded General Hoche in the command of the Army of the North, which was in a state of great disorder. He restored order and discipline, and the result of the energy and activity which he displayed during the winter campaign, was that the Prince of Orange abandoned his army, and recommending the States of Holland to make no more resistance, fled to England, and nothing remained for the French but to take possession of the whole country. On his return, Pichegru was appointed general of the Army of Paris; and afterwards joined the Army of the Rhine, where he entered into a correspondence with the Prince of Condé, with a view of restoring the Bourbons to the throne. His treason being shortly suspected, he was superseded in command by Moreau, in 1796. The embassy to Sweden was offered to him, and declined, and he retired to a small property which he possessed in Upper Saone, for which department he was elected in 1797. He next became president of the Council of Five Hundred, but being detected in a conspiracy to overthrow the republican party, he was arrested Sept. 4, 1797, and transported to Cayenne. After eight months he made his escape to England. In 1804 Pichegru and Georges Cadoudal were employed with several of the Vendean leaders to organise a plot to overthrow the government of the First Consul. Being detected, Pichegru was arrested at Paris, Feb. 17, and sent to the Temple. While a process was being commenced against him, he was found strangled in prison, on the morning of April 6, 1804.

PICIDÆ. [WOODPECKERS.]

PICO. [AZORES.]

PICRIS, a genus of plants belonging to the natural order *Compositæ*, and the suborder *Cichoraceæ*. *P. hieracioides*, the only British species, has bright yellow flowers, and is found on dry banks.

PICROSMINE, a mineral which occurs crystallised and massive, and consisting chiefly of silica and alumina. The crystals are right rhombic prisms, greenish in colour, and nearly opaque. The massive varieties are thin and fibrous.

PICROTOXIN, the principle to which *Cocculus Indicus* owes its deleterious properties. It appears in the form of acicular crystals, intensely bitter.

PICTOR, FABIUS. [FABIUS PICTOR.]

PICTS, an ancient people of North Britain, whose origin and history are singularly obscure, and have furnished matter for endless speculation and controversy. The earliest mention of them by any ancient writer occurs in an oration addressed by the rhetorician Eumenius to the emperor Constantius Chlorus, on his return from his victory over the usurper Allectus, in the year 296.

The main dispute with regard to the Picts, as with regard to the Caledonians, with whom they have been sometimes identified, the Scots, the Cimbri of antiquity, and the Cymry or modern Welsh, the Belgæ, and the Irish Firbolgs, has been, whether they were a Celtic or a Teutonic people. The most curious and valuable fact that we possess in relation to this matter is, that their

language appears to have nearly resembled that of the Welsh.

The greatest diversity of opinion has also prevailed as to the extent of the territory occupied by the Picts in the north of Britain. During the greater part of the time that it subsisted, the Pictish kingdom appears to have been bounded S. by the Frith of Forth, and W. by the mountainous range still separating the Lowlands from the Highlands of Scotland. The kingdom of Strath-Clyde, or Cumbria, however, or Reged, as it was usually designated by the Welsh, which comprised the S.W. of Scotland, and perhaps also the county of Cumberland (if that did not form a separate state), must be regarded as having also been Pictish on the hypothesis which assumes the Picts to have been the same people with the Welsh, the latter being admitted on all hands to be of the same race with the people of Strath-Clyde.

The history of the Pictish kingdom established in the north-east of Scotland is, as may be supposed, exceedingly scanty and obscure. Bede and Ailred state that the Southern Picts were converted to Christianity by St. Ninian about 412. The conversion of the Northern Picts is attributed to St. Columba, about 565.

No passage of the obscure story of the Picts is involved in greater darkness than the sudden termination of their dominion in their principal seat, the N.E. of Scotland. It is however certain that Kenneth II., or Kenneth Macalpin, having been originally King of the Scots, or Dalriads, became King of the Picts about 843, the date assigned to his conquest of that people. Kenneth, we may here notice, appears to have followed up this success by a course of policy having for its aim the ultimate incorporation with his own dominions of the adjoining (perhaps Pictish) kingdom of Strath-Clyde; and that object was in fact accomplished, and the whole of what is now called Scotland brought (nominally at least) under one rule, in the year 973, in the reign of his great-great-grandson Kenneth III. Even down to a considerably later date than this however, a great part of the N.E. of Scotland appears to have been actually held by Norwegian princes, who did not acknowledge the sovereignty of the descendants of Kenneth Macalpin; and even some of the great Highland chiefs of the west long continued to maintain almost as substantial if not as openly avowed an independence.

Certain singular architectural remains found in some parts of Scotland are still popularly known there by the name of Picts' Houses: and the Picts, or Pechs, live in the traditions of the country as a people of almost superhuman strength and dexterity.

PICUS. [WOODPECKERS.]

PIEDMONT, PIEMO'NTE, or PIE' DI MO'NTE, which means a country at the foot of mountains, is the old name of a district of North Italy which forms part of the Sardinian States. It has the title of a principality, and the eldest son of the king of Sardinia is styled Prince of Piedmont. But Piedmont is no longer an administrative denomination, that tract of country being included in the division of Turin, which is subdivided into the provinces of PIGNEROL, SUSA, TURIN, BIELLA, and IVREA.

The name of Piedmont however was also and is still occasionally used as a general denomination for that part of the continental territories of the king of Sardinia which is situated on the Italian side of the Alps, and between the Alps and the Ligurian Apennines, as distinguished from the other great divisions of the monarchy, namely, the duchy of Savoy, the county of Nice, and the duchy of Genoa.

During the middle ages this fine country was parcelled out into several feudal principalities and lordships, under a nominal allegiance to the German emperors as kings of Italy, namely:—1, the principality of Piedmont Proper; 2, the duchy of Aosta; 3, the duchy of Monferrato; 4, the marquisate of Saluzzo; 5, the county of Asti; 6, the marquisate of Ceva; 7, the lordship of Vercelli. They all fell eventually into the hands of the house of Savoy. [SARDINIAN STATES.]

PIER (from the French *pierre*, stone) the general name for the solid spaces between a series of openings in a wall, whether windows or arches; but in its technical meaning the term is more particularly applied to the pillar-like masses of masonry or brickwork from which arches spring, rising from what is termed the impost capping the pier, and which generally consists of a series of mouldings, although sometimes it is merely a platband, and occasionally the impost is omitted altogether, especially in rusticated basements. In many instances columns are substituted for piers, placed either singly or in pairs; and the arches spring either immediately from their capitals or from an entablature over them. There are again many examples in which both piers and a lesser order or sub-order of columns are employed, the latter being insulated on each side of the pier, and their entablature forming the impost from which the arches spring.

The term pier is also applied to the solid masses supporting the arches of a bridge; with the exception of the extreme ones, which are distinguished by the name of abutments. The term is also applied to a mole or jetty carried out into the sea, whether intended to serve as an embankment to protect vessels from the open sea, or merely as a landing-place; for which latter purpose suspension chain-bridges are now frequently employed.

PIERMARI'NI, GIUSEPPE, born at Foligno, July 18, 1734, went to Rome, and applied himself with ardour to mathematics and architecture, which last he studied first under Poggi, and next under Vanvitelli. When Vanvitelli was invited to Milan, by the Austrian government, for the purpose of altering and embellishing the palace there, he transferred the work, after making some general designs, to Piermarini (1769), who thus found himself established at Milan, with the title of architect to the archduke, and inspector-general of buildings. Afterwards, on the Academy of Fine Arts at the Brera being established, he was appointed to the professorship of architecture. For thirty years Piermarini was constantly employed at Milan, which is indebted to him not

only for most of the principal structures erected at that period, but also for the more correct taste which he introduced both by his example and his precepts. Had he executed nothing of any note besides the theatre Della Scala, that edifice alone would have secured his professional fame. Some years before his death, political changes induced him to retire to his native town Foligno, where he died, Feb. 18, 1808.

PIERRE, JAQUES-HENRI-BERNARDIN DE SAINT, was born at Hâvre, Jan. 19, 1737. After studying at Paris, he entered the department of civil engineers under the government. A reduction however, which took place some time after, left him unemployed, and he entered the army as military engineer; but having quarrelled with his superior he was dismissed from the service. After serving for some time as an engineer in the Russian service, the Baron de Breteuil procured him a commission as engineer in the Isle of France, or Mauritius, where he lived two years. He then returned to Paris, where he published his tale of 'Paul et Virginie.' The most important of his other works are—'Études de la Nature;' 'La Chaumière Indienne;' 'Harmonies de la Nature;' 'Essai sur J. J. Rousseau,' besides several plays. The principles of the Revolution were in accordance with his own theories of government, but when the reign of terror came he was in some danger, especially as he ventured publicly to profess his belief in God, which, in 1794, was considered by some of the ruling men as a ground of suspicion. At last he found a protector in Joseph Bonaparte, who assigned him a pension. Napoleon gave him the cross of the Legion of Honour, with a pension.

Bernardin de St. Pierre died Jan. 21, 1814. His works have been published, with his biography, 'Œuvres de J. H. Bernardin de Saint-Pierre,' 2 vols. 4to., Paris, 1836.

PIERRELATTE. [Drôme.]

PIG. [Hog.]

PIG-NUT. [Bunium.]

PIGAFE'TTA, ANTONIO, born at Vicenza in the latter part of the 15th century, of a patrician family, applied himself to the study of mathematics and geography. Having gone to Spain in the suite of the papal nuncio, he joined the expedition of Magalhaens, as a volunteer, in Sept. 1519. Being gifted with a robust frame, he bore the hardships and escaped the diseases which destroyed most of the crew. He returned to Spain in Sept. 1522, having performed in the course of three years the first voyage round the globe. Pigafetta afterwards returned to Italy, and, at the request of Pope Clement VII., he wrote a narrative of his voyage, which however was not published until the year 1800 under the title of 'Primo Viaggio intorno al Globo.' *Pigafetta's* was the first account that Europeans had of the islands in the Pacific Ocean. Of Pigafetta's personal history after his return to Italy nothing is known, except that he was made a knight of the order of St. John.

PIGALLE, JEAN BAPTISTE, the son of a carpenter, was born at Paris in 1714. He was the pupil of Robert le Lorrain and the elder Lemoyne, and studied sculpture in Rome. On his return to Paris he attracted great notice and obtained a permanent reputation by a statue of Mercury. The king (Louis XV.) purchased the statue, and the Royal Academy of Painting and Sculpture elected Pigalle a member. Louis XV. ordered the sculptor to make a Venus as a companion to this Mercury, which however was considered unequal to it, and the king presented them both to Frederick the Great of Prussia: they are still at Sans Souci. Another celebrated work by Pigalle is the statue of Louis XV. at Rheims; but his masterpiece is the great allegorical monument of the Maréchal de Saxe at Strasburg. He is considered one of the best sculptors of the 18th century, though his taste cannot be called classical. He died at Paris in 1785, as Chancellor of the ancient Academy of Painting and Sculpture.

PIGEON. [Columbidæ.]

PIGEON PEA is the seed of the plant called, by Linnæus, *Cytisus Cajan*, and by De Candolle, *Cajanus bicolor* and *flavus*. It is a kind of pulse highly esteemed by all classes of the natives of India, and is by them regarded as holding the third rank among such articles of food. Cattle are said to be fond of the tender parts of the plant, whether green or dry.

PI'GHIUS, STE'PHANUS VINAND, was born in 1520, at Kempen in the province of Overyssel, in the Netherlands. After studying in his native country and at Cologne, he entered the ecclesiastical profession, and repaired to Rome, where he was well received on account of his uncle's reputation, Albertus Pighius, then dead, in honour of whom he added the name of Pighius to his paternal name of Vinand. He spent eight years at Rome in studying antiquities, examining monuments, and copying inscriptions. On his return to the Netherlands he was made librarian to Cardinal Granvelle, after whose death he was appointed by the Duke of Cleves preceptor to his son, with whom he travelled through Italy about 1575. The young man however died at Rome, and Pighius returned to his native country, and retired to the town of Xanten, of which he was a canon. He died in 1604, after publishing the first volume of his great work 'Annales Romanorum,' leaving the MS. of the remainder to the Jesuit Andreas Schott, who published the two following volumes. The edition of the whole work is in 3 vols. folio, Antwerp, 1615.

PIGNEROL, or *Pinerolo*. [Torino.]

PIGNOTTI, LORENZO, was born in 1739, at Figline in the Val d'Arno, and took his degree of doctor of Medicine at Pisa. After practising for some time at Florence, he was made professor of natural philosophy at Pisa, where he died in 1812. His principal work is the history of Tuscany, 'Storia della Toscana sino al Principato, con diversi Saggi sulle Scienze, Lettre, ed Arti,' 9 vols. 8vo., which was published after his death. Galluzzi wrote the latter part of this work, 'Istoria del Gran Ducato di Toscana sotto il Governo della Casa Medici,' 5 vols. 4to., Florence, 1787.

Pignotti wrote also a series of Fables or Apologues in Italian verse, which have been often

reprinted. He wrote also some odes and other poetical compositions, 'Poesie di Lorenzo Pignotti,' Florence, 1820.

PIKE, the English name for a fish belonging to the order *Malacopterygii*, section *Abdominales*, family *Esocidæ*, and genus *Esox*. The pike tribe were regarded by Linnæus as forming a genus, but in modern works on ichthyology they constitute a family. They have no adipose fin, as in the *Salmonidæ*, and are distinguished by the upper jaw being formed chiefly by the intermaxillary bones; the maxillary are destitute of teeth, and concealed by the lips; the dorsal and anal fins are almost always opposite each other, and the intestine is short and without cæca. To this family belong the genera *Esox* (or pikes proper), *Galaxias*, *Alepocephalus*, *Microstoma*, *Stomias*, *Chauliodus*, *Salanx*, *Belone*, *Scomberesox*, *Hemiramphus*, *Exocetus*, and *Mormyrus*.

For a history of the Pike, Jack, Luce, or Gedd (*Esox Lucius*), the Garfish, or Mackerel-Guide (*Belone vulgaris*), the Jaury-Pike, or Skipper (*Scomberesox saurus*), and the Flying-Fish (*Exocetus volitans*), see Yarrell's *British Fishes*. For a very interesting account of the Flying-Fish, see Bennett's *Wanderings*, vol. i. [FLYING-FISH.]

PILASTER. [CIVIL ARCHITECTURE; COLUMN.]

PILATE, PONTIUS, is chiefly known by the part which he occupies in the New Testament history. Nothing is recorded of his extraction. Pilate was a man of the equestrian order, and he was appointed governor of Judæa by Tiberius, A.D. 26. Eusebius and others relate that Pilate was banished to Vienne in Gaul for behaving with barbarity to the Samaritans, and that, unable to endure his disgrace, he killed himself with his own hand, about the year 38.

PILCHARD. [CLUPEIDÆ; FISHERIES.]

PILE-ENGINE is a machine by which a heavy mass of iron is raised to a considerable height in the air; the mass being then allowed to fall by gravity on the head of a pile, the momentum acquired by the descent forces the pile into the ground.

Such an engine is employed in driving piles for the support of the sleepers or horizontal timbers on which are built the piers of bridges, the revetments of the ramparts of fortresses, or any other heavy mass of brick-work or stone-work when the soil is not sufficiently firm to carry the structure. Piles are also thus driven in order to form coffer-dams in rivers, preparatory to the construction of piers or the faces of quays, basins, &c.

The most important improvement in pile-engines is the steam-hammer of Mr. Nasmyth. The principle of this most powerful instrument consists in having a small steam-engine so connected with the ram or hammer, that after the latter has fallen by its own gravity, it is raised again by the action of steam. The saving of the time by the use of this machine is very great, and the invention is one of singular importance in engineering. It is applicable to the forging of anchors, and other works, where powerful blows are to be given.

PILEOPSIS, Lamarck's name for a genus of mollusks (*Capulus* of De Montfort, which name has the priority) whose place in the system was long doubtful.

The form was arranged by Linnæus under his genus *Patella*, with the name of *Patella Ungarica*.

Lamarck divided his genus *Pileopsis* into two sections; the first consisting of those species whose shell was without any known support (*Pileopsis*, Lam., *Capulus*, Montf.); the second consisting of those species whose shell had a known support (*Hipponyx*, Defrance).

For a complete account of the affinities of *Pileopsis* and *Hipponyx*, the reader may consult Mr. G. B. Sowerby ('Genera,' No. i. and No. xxxviii.).

Several fossil species of the above forms occur in tertiary deposits.

PILES, ROGER DE, was born in 1635 at Clamecy, in the province of Le Nivernois, now the department of La Nièvre. Having been engaged by President Amelot, in 1662, as tutor to his children, he accompanied young Amelot to Italy, and on his return published some essays on painting, an art for which he had previously manifested considerable partiality. His pupil having been appointed ambassador to Venice, De Piles was employed as his secretary of legation. He also accompanied him to Lisbon in 1685, and to Switzerland in 1689, and was the bearer to Louis XIV., of the treaty of Neutrality, which his ambassador had just concluded with the thirteen cantons. Louis next sent him to the Hague, to enter into secret negotiations with a party in Holland which was desirous of peace. Being discovered, he was arrested by order of the Dutch government, and during his confinement he wrote his 'Lives of the Painters.' When he returned to France a pension was granted him. Amelot being appointed ambassador to Madrid, De Piles accompanied him, but his health being very indifferent, he was obliged to return to Paris, where he died May 5, 1709. A collection of his writings was published at Paris, in 1767, in 5 vols. 12mo.

PILGRIM is the name given to a person who travels for the purpose of visiting the shrines or tombs of holy men, and the act itself is called Pilgrimage. The words pilgrim in English, *pellegrino* in Italian, *pélerin* in French, are all corruptions of the Latin 'peregrinus,' which means a stranger or foreigner. Pilgrimages to the 'Holy Land' began probably about the time of Constantine. The practice became common about the end of the fourth century, and we find it noticed as such by the fathers of the church, Jerome, Augustin, and others. Many of the fathers condemned the custom.

In the course of time the practice of pilgrimage increased, and extended to other places besides Palestine. People resorted to the shrines of St. Peter and St. Paul at Rome, to that of St. Ingo de Compostella in Spain, of St. Gregory of Tours in France, to the monastery of Einsiedlen in Switzerland, to our Lady of Loreto in Italy, to the tomb of Thomas à Becket at Canterbury, and to several other places.

The institution of the Roman Jubilee, which

perpetuated the custom of pilgrimages to Rome, is due to Boniface VIII.

The Mohammedans have also their pilgrimages. The ceremonies performed by the pilgrims at Mecca have been related at length by Burckhardt and other travellers.

The Hindoos also have their places of pilgrimage, one of the most celebrated of which is that of Juggurnauth, on the coast of Orissa, in Hindustan.

PILING OF SHOT. The disposal of horizontal layers of shot one above another so as to form a pyramid or a wedge. The rules for finding the number of shot in a pile are investigated in almost every elementary course of mathematics. If n be the number of layers, the formula for the number of shot in a complete triangular pile is,

$$\frac{1}{6} n (n + 1) (n + 2);$$

in a complete square pile,

$$\frac{1}{6} n (n + 1) (2 n + 1);$$

and if n and $n + m$ be the numbers in the shorter and longer sides of an oblong rectangular pile, or wedge, the number of shot is,

$$\frac{1}{6} n (n + 1) (2 n + 1 + 3 m);$$

PILLAR. [COLUMN.]

PILLAU, a seaport in East Prussia, with 3600 inhabitants, is situated at the extremity of a tongue of land between the Baltic and the Frische-Haff. It is a place of considerable importance, for as the Haff is too shallow to allow large or heavily laden ships to go up to Königsberg and Elbing, they are either lightened of part of their cargo, or remain at Pillau, and the goods are conveyed to those ports by lighters, which also bring back the return cargoes. Near to the town there is a lighthouse, and a fortress which defends the entrance of the Haff. Pillau derives great advantages from its fisheries, especially of sturgeons, from the roe of which caviare is prepared.

PILLNITZ. [PIRNA.]

PILLORY. The pillory was a mode of punishment for crimes by a public exposure of the offender, used for many centuries in most of the countries of Europe under various names. In France it was called *pillorie*, and in more recent times *carcan*; and in Germany, *pranger*. It was abolished in England in the year 1837, by the statute 1 Vict. c. 23.

The English pillory was a wooden frame or screen, raised several feet from the ground, and behind which the culprit stood, supported upon a platform, his head and arms being thrust through holes in the screen, so as to be exposed in front of it; and in this position he remained for a definite time, sometimes fixed by law, but usually assigned at the discretion of the judge who passed the sentence.

PILON, GERMAIN, died at Paris in or about 1605; the year and the place of his birth are doubtful. He was the favourite sculptor of Henry II. and Catherine de Medici, and there are still many works by him in Paris, executed in that reign. Among his most remarkable works are the statues of the tomb of Henry II., in St. Denis, Le Tombeau des Valois; but the group of three graces clothed, on a triangular pedestal, supporting on their heads a gilded bronze urn, which contains the hearts of Henry and Catherine, formerly in the convent church of the Celestins, and now in the Louvre, is considered his masterpiece.

PILOT. In many maritime countries the name of pilot is applied to a constant officer in a ship, who has the charge of the helm and the general direction of the ship's course; and also to a person who undertakes the special charge of navigating ships in particular rivers, roads, or channels, or in entering and leaving ports, and who is entrusted with such charge independently of the captains or masters, in consequence of his peculiar acquaintance with the navigation within the limits to which his duty is restricted. By the laws of many maritime countries, taking a pilot to navigate a vessel on approaching port has been considered from early times to be obligatory on the master. Thus by the laws of Wisbuy, which were promulgated in the 12th century, and were incorporated in the marine laws of most European countries, it was compulsory on the master to take a coast-pilot on board, though the merchant or master opposed it. ('Ordonnances de Wisbuy,' art. 44.) In this country, pilots are established at several ports for limited parts of the coast, who are appointed and regulated sometimes by acts of parliament, and sometimes by charters of incorporation; and in general the master of a ship engaged in foreign trade must put his ship under the charge of such a pilot, both in his outward and homeward voyage, within the limits of every such establishment. Pilotage in the Thames and Medway, and along the coast, from Orfordness to the Isle of Wight, excepting the jurisdiction of the Cinque Ports, has been for several centuries under the management of the corporation of the Trinity House, and acts of parliament have been from time to time passed to regulate the Trinity-House and Cinque-Port pilots. All these regulations were reconsidered by parliament in the year 1825, and the majority of them were consolidated in the statute 6 Geo. IV. c. 125, which contains also some general provisions respecting pilots in other parts of the kingdom. The 12 & 18 Vict. c. 88, enacts that masters and mates of ships, after undergoing such examination and receiving such certificate as the act requires, may act as pilots, within the limits specified by such certificates, of the ships of which they are respectively masters or mates. (*Abbott On Shipping*, p. 173, *edit.* 1840.)

PILPAY. [BIDPAI.]

PILSEN, a well-built fortified town in Bohemia, is situated in a beautiful and extensive valley at the conflux of the Bradawka and the Mies, in 49° 45′ N. lat., 13° 25′ E. long., at a distance of 50 miles S.W. from Prague, and has about 9000 inhabitants. The most remarkable public buildings are—the fine Gothic church of St. Bartholomew, the gymnasium, the town-hall, and the house of the Teutonic knights. Pilsen has

considerable manufactures of cloth and morocco leather. There are four annual fairs. The inhabitants trade in the productions and manufactures of Bohemia, and in cattle, iron, potashes, feathers, wool, leather, cloth, &c.

PILULA'RIA, a genus of plants belonging to the natural order *Marsileaceæ*. Of this genus there is but one species, *P. globulifera*, which on account of the form of its fruit is called Pillwort or Pepper-Grass. This plant is a native of Europe, and is found in Great Britain on the extreme margin of ponds or on swampy ground, covered with water during the winter and comparatively dry in the summer. It is interesting to the systematic botanist, as affording a high development in the organs of reproduction in the class of Acrogens to which it belongs.

PILUMNUS, Dr. Leach's name for a genus of Brachyurous Crustaceans.

This genus very much resembles the Crabs properly so called; but differs from them principally in the number of pieces in the abdomen of the male, and is removed from them still farther by the mode of insertion of the external antennæ.

M. Milne Edwards arranges the genus under his *Cancériens Arqués*.

Example, *Pilumnus hirtellus*, Leach (*Cancer hirtellus*, Linn.).

Locality, the coasts of England and France; they are generally found under stones.

(Leach, *Malac. Brit.*, t. 12; Pennant, *Brit. Zool.*, vol. iv., pl. 6, lower figure.)

PIMENTA, or PIMENTO, the produce of *Eugenia Pimenta*, a tree native of the West Indies, but cultivated almost exclusively in Jamaica, thence called Jamaica Pepper. The unripe two-seeded berries, which are about the size of a pea, are dried by frequent turning in the sun, by which their colour is changed from green to brown or grayish-brown. The shell is very brittle, about the thickness of a card, and encloses two seeds, which are roundish, dark brown, somewhat shining, and having a weak aromatic taste. The shell possesses an agreeable clove-like taste and smell. Two kinds are met with in commerce, English and Spanish, of which the former is the better.

PIMPERNEL is the English name of the *Anagallis arvensis*, a little red-flowered annual found in corn-fields. It is often called the Shepherd's or Poor Man's Hour-Glass: it opens its flowers every morning about ten minutes past seven in these latitudes, and closes them a few minutes after two. If rain falls, or the air is charged with moisture, the flowers do not open at all.

PIMPINELLA, a genus of umbelliferous plants inhabiting the meadows and mountains of Europe principally, is chiefly interesting on account of its comprehending among its species the Anise of the shops. This plant is an annual. The fruit is employed extensively as a carminative medicine, and for the purpose of flavouring liqueurs. The plant inhabits Egypt and the islands of the Grecian archipelago, especially Scio.

PIN. The first thing to be done in the manufacture of pins by the hand-method is to reduce a quantity of brass wire to the requisite size. This is generally done in the pin-factory, as the wire is received of larger diameter than necessary. It is performed in the usual manner of wire-drawing; and the wire is then made up into coils of six inches diameter, and any dirt or crust which may be attached to the surface is got rid of by first soaking the coils in a diluted solution of sulphuric acid and water, and then beating them on stones. The next process is to straighten the wire; after which it is cut into pieces, each about long enough for six pins. These latter pieces are then pointed at each end, in the following manner—The person so employed sits in front of a small machine, which has two steel wheels or mills turning rapidly; of which the rims are cut somewhat after the manner of a file, one coarse, for the rough formation of the points, and the other fine, for finishing them. Several of these pieces are taken in the hand, and by a dexterous movement of the thumb and fore-finger are kept continually presenting a different face to the mill, against which they are pressed. The points are then finished off by being applied in the same manner to the fine mill. After both ends of the pieces have been pointed, one pin's length is cut off from each end, when they are repointed, and so on until each length is converted into six pointed pieces. The stems of the pins are then complete. The next step is to form the head, which is effected by a piece of wire called the mould, the same size as that used for the stems, being attached to a small axis or lathe. At the end of the wire nearest the axis is a hole, in which is placed the end of a smaller wire, which is to form the heading. While the mould wire is turned round by one hand, the head wire is guided by the other, until it is wound in a spiral coil along the entire length of the former. It is then cut off close to the hole where it was commenced, and the coil taken off the mould. When a quantity of these coils are prepared, a workman takes a dozen or more of them at a time in his left hand, while with a pair of shears in his right he cuts them up into pieces of two coils each. The heads, when cut off, are annealed by being made hot and then thrown into water. When annealed, they are ready to be fixed on the stems. In order to do this, the operator is provided with a small stake, upon which is fixed a steel die, containing a hollow the exact shape of half the head. Above this die, and attached to a lever, is the corresponding die for the other half of the head, which, when at rest, remains suspended about two inches above the lower one. The workman takes one of the stems between his fingers, and dipping the pointed end into a bowl containing a number of the heads, catches one upon it and slides it to the other end; he then places it in the lower die, and, moving a treadle, brings down the upper one four or five times upon the head, which fastens it upon the stem, and also gives it the required figure. There is a small channel leading from the outside to the centre of the dies, to allow room for the stem. The pins are now finished as regards shape, and it only remains to tin or whiten them.

A quantity of them are boiled in a pickle, either a solution of sulphuric acid or tartar, to remove any dirt or grease, and also to produce a slight roughness upon their surfaces, which facilitates the adhesion of the tin. After being boiled for half an hour, they are washed, and then placed in a copper vessel with a quantity of grain tin and a solution of tartar; in about two hours and a half they are taken out, and after being separated from the undissolved tin by sifting are again washed; they are then dried by being well shaken in a bag with a quantity of bran, which is afterwards separated by shaking them up and down in open wooden trays, when the bran flies off and leaves the pins perfectly dry and clean. The pins are then papered for sale.

The drawing and cutting the wire, the cutting of the heads from the coils, and the tinning, are performed by men; the other operations by women and children.

Machines have been invented, and partially employed for some of the processes; but most pins are made by the hand method.

PIN-MONEY. Gifts by a husband to his wife for the purchase of apparel, ornaments for her person, or for her private expenditure, are called Pin-Money; and such gifts may either be made during marriage, or, what is the more usual case, a sum of money for that purpose may be secured by the husband to his wife by settlement, or by articles executed before the marriage. Perhaps it is only money secured before marriage for the purposes enumerated that is properly called Pin-Money; for a gift of money by the husband to the wife after marriage is liable to the husband's debts; but a provision for Pin-Money is not so liable, and the wife is entitled in all cases to such money, and to her savings out of it, and things bought with it.

PINDARUS was born at Cynoscéphalæ, a village between Thebes and Thespia, B.C. 518, according to Clinton, or in B.C. 522, according to Böckh, and died, according to the former computation, in B.C. 439, according to the latter in B.C. 442, having completed his eightieth year.

Pindar's family were hereditary flute-players, and their profession was in great reputation at Thebes. It is said that he profited chiefly by the advice and example of Corinna, the Tanagræan poetess, whose odes were of the same mythical character with those of Pindar. Corinna frequently contended against her pupil in the musical contests, and gained five victories over him. Pindar early commenced his career as a composer of choral odes for special occasions. He soon rose to the highest rank, and spent his long life in a profitable intercourse with the tyrants and wealthy men of Greece and the colonies.

The specimens of Pindar's works which have been preserved are, with the exception of the '11th Nemean Ode,' Epinician or triumphal odes. But he also wrote dithyrambic pæans, dirges, drinking songs, and other things, of which there are numerous fragments. The character of his Epinician Odes was determined by the subject: he had to sing the praises of those who gained a victory at the public games, either by the speed of their horses, by strength of body, by skill in gymnastic exercises, or by musical talent. The native city of the victor came in for its share of the poet's praise; and with the praise of the city were connected the legends of its early history. The mythical and religious element enters largely into the odes of Pindar, and leads to digressions, which however are connected with the main purpose of the ode.

Pindar has great power in description, of which his picture of the eruption of Mount Ætna is an example. He abounds in striking and sometimes extravagant metaphors. There are also passages of a jocular, and even of a coarse character, which must be estimated not by the rules or practice of modern lyric poetry, but by his period and the occasion of his odes. These odes were sung to the loud flute, as much as to the more tranquil music of the harp.

The fragments of the other compositions of Pindar are collected in the editions of his Epinician Odes; and, as far as we can judge from fragments, many of these poems had great merit. The best edition of Pindar is by A. Böckh, Leipzig, 1821, 3 vols. 4to. Dissen published in 1830 a smaller edition, which may be considered an abridgment of Böckh's. There are translations of Pindar by West and Moore, but they are considered inferior to that by the Rev. H. F. Carey, London, 1833.

PINDEMO'NTE, IPPO'LITO, born at Verona, in 1753, was a younger son of a patrician family. His elder brother, Giovanni, wrote some tragedies, among others, 'I Baccanali,' which were much esteemed at the time. Ippolito studied at the college of Este, and afterwards at Modena. On completing his studies, he travelled through Europe. Being made a knight of the order of St. John, he went to Malta, where he resided some time, as well as in Sicily. When he was about 30 years of age, a serious illness induced him to retire to Avesa near Verona, where he wrote his 'Prose e Poesie Campestri,' published first in 1785. The philosophy of his prose is of the contemplative kind, but it is warm-hearted and liberal. His poetry is beautifully harmonious and flowing. Pindemonte afterwards published a volume of 'Sermoni,' in verse, satires after the manner of Horace, in which he lashes, in a good-humoured strain, the follies of the age.

Pindemonte wrote a drama, 'Arminio,' in which he introduced a chorus. He also published a translation of the 'Odyssey,' in Italian blank verse, which was well received. His last work was his 'Elogi di Letterati,' a biographical work in prose, 2 vols. 8vo., 1825-6. He died at Verona, Nov. 1828. His unblemished character, his amiable disposition, and his great accomplishments, contributed as much as his writings to mark him as one of the most distinguished Italians of his age. A monument has been raised to his memory by his townsmen of Verona.

PINE. [PINUS.]

PINE-APPLE, the fruit of the *Ananassa sativa*, Lindley, a tropical plant, indigenous to South America and some of the West India Islands. It has become so perfectly naturalised in many parts of the hot regions of Asia and

Africa, that it has been thought to be likewise a native of those countries. It was however first introduced into Holland from South America, whence it was brought to this country in 1690 by the Earl of Portland. The pine-apple is now cultivated extensively for the European markets in the West Indian Islands and South America, and its cheapness has greatly increased the consumption of this delicious fruit amongst all classes.

In growing pine-apples artificially, the temperature of the atmosphere should be about 80°, or a minimum not lower than 70° at any time of the year, and a maximum not higher than 90°. When, from the shortness of our days in winter, there is a deficiency of light, and when forcing the plant in its absence would produce only imperfectly formed tissue, 70° will be proper. In summer 80° to 85°, or in the case of fruiting plants, from that to 90° will not be too much. The maximum by sun-heat may extend higher, but 100° should be its limit.

With regard to bottom-heat, it should be in imitation of the heat of the tropical soil; and this varies even less than the temperature of a tropical atmosphere. It should never be allowed to fall below 75°, nor rise higher than 90°.

The soil for pine-apples requires to be rich. A fresh yellow loam, strong, but by no means of a binding nature, with which is mixed a quantity of cow-dung, will answer very well. It is very important that a perfect drainage be at all times maintained. Moisture is essential for the growth of the pine-apple. The condition of the soil in the pots will of course indicate whether water should be applied or withheld. But in summer the atmosphere should be kept moist by syringing, particularly before shutting up at night. No water should on any account be used of a temperature many degrees lower than that of the soil in the pots where the plants are growing; it should not, in short, be applied lower than 75°, and 80° will prove a good medium.

Pine-apples, instead of being confined in pots, are sometimes planted in a bed of soil. This has been found to answer very well where good drainage was secured, and where a proper degree of bottom-heat could be applied. They have also been grown in pots placed on shelves or on sand; this mode however has not proved very successful.

PINE'DA, JUAN DE, born at Seville, in 1557, entered the order of St. Francis, and acquired a great reputation for general erudition, especially in the Greek, Hebrew, and Oriental languages. On being appointed counsellor to the court of the Inquisition, he was commissioned to visit the principal libraries of Spain, in order to register those works which might be obnoxious to the Roman Catholic religion. The result of his inquiry was an 'Index novus Librorum Prohibitorum,' Seville, 1631, published by order of Cardinal Zapata, grand-inquisitor of Spain. Pineda published a few other works, one of the most important of which is 'Monarchia Ecclesiastica, o Historia Universal del Mundo desde su Creacion hasta estos Tiempos,' 5 vols. fol., Barcelona, 1620. This work is a universal history of the world in 30 books, and is written with some display of erudition but no discrimination, and with all the intolerant spirit of an inquisitor.

PINELLI, BARTOLOMEO, a very eminent artist of recent years at Rome, known as painter and etcher. He painted in oil and water-colours, but is chiefly known for his etchings from Roman history and Roman costume. The works by which he is chiefly known out of Rome are published under the following titles: 'Istoria degli Imperatori inventata ed incisa in Cento Rami da B. Pinelli,' 1829; 'Raccolta di Costumi Pittoreschi incisi all' Acqua Forte da B. Pinelli Romano,' 1809; 'Nuovo Raccolta di Cinquanta Costumi Pittoreschi,' &c., 1816. Pinelli died at Rome, in the vigour of life, in 1835.

PINERO'LO, or *Pignerol*. [TORINO.]

PINGUI'CULA, a genus of plants belonging to the natural order *Lentibulariaceæ*. *P. vulgaris* is found in bogs in England. *P. grandiflora* is much larger than the former species: the flowers are large, of a deep purple colour. It is found in Ireland about Kerry and Cork. *P. Lusitanica* is found in the western parts of this country. These species derive their common name, Butterworts, from the greasy appearance of their foliage. Like other marshy plants, they have been said to produce flukes in the sheep that feed upon them. This however is attributable rather to the larvæ of the fluke, which adhere to the leaves of plants in marshy districts, and are thus taken in by the animal, than to any peculiarity in the *Pinguicula*.

PINIC ACID is obtained from common resin: it forms a series of salts, called *pinates*, with soda, potash, ammonia, and other bases; but neither the acid nor the salts have been much investigated.

PINITE, a mineral which occurs in imbedded crystals, generally hexagonal prisms; reddish-gray and opaque. It consists chiefly of silica and alumina.

PINK. [CARNATION; DIANTHUS.]

PINKERTON, JOHN, was born in Edinburgh, in 1758. He was articled to a writer to the signet, but after being in his office five years, turned author, and published in 1776, an elegy entitled 'Craigmillar Castle.' On the death of his father in 1780 he came to London, and produced several critical and antiquarian works, with considerable success. One of the few of his productions however which have retained their interest and value is his 'Ancient Scottish Poems' from the MS. collection of Sir Richard Maitland, London, 1786. This work has been unjustly called a literary forgery, on account of the author having previously published some 'Select Scottish Ballads,' many of which he confessed were fabrications. Among the best of his numerous works may be mentioned his 'Dissertation on the Origin and Progress of the Scythians or Goths,' 8vo., 1787; the 'Enquiry into the History of Scotland,' 2 vols. 8vo., 1789; and the 'History of Scotland from the Accession of the House of Stuart to that of Mary,' 2 vols. 4to., 1797. In 1802 Pinkerton left England, and for the rest of his life resided chiefly in Paris, continuing however to give occupation to the press of

his native country with his usual industry. He died at Paris, March 10, 1826.

PINNOTHE'RIANS, a tribe of the third family of the Brachyurous Crustaceans (*Catametopès*), according to the arrangement of M. Milne Edwards.

The Pinnotherians are small crustaceans whose carapace is nearly circular, and whose teguments exhibit considerable softness. Their eyes are in general very small, and the disposition of their front and their antennæ varies, as also their external jaw-feet, which present remarkable anomalies. Their feet are short or of moderate length, and are in general very weak. The abdomen of the male is much narrower at its base than the corresponding part of the sternal plastron.

But it is the singular habits of these crustaceans which especially demand attention; for they ordinarily are housed between the mantel-lobes of certain conchifers—*Mytilus, Pinna, Mactra*, &c., for example.

M. Milne Edwards arranges in this small group, the genera *Pinnotheres, Doto, Mictyris, Hymenosoma*, and *Elamena*; but he acknowledges that this tribe is not so natural as might be desired, and that hereafter perhaps the necessity for subdividing it may arise.

PINT, the half of a quart, and the eighth part of a Gallon, which is the standard measure connected with the pint. [GALLON.]

PINTAIL DUCK. [DUCK.]

PINTELLI, BACCIO, the architect of the Capella Sistina. He is supposed to have been a Florentine. He was very active in Rome in the pontificate of Sixtus IV. (1471–1484), for whom the Capella Sistina was built. This chapel architecturally is of little interest, but, as containing some of the greatest works of Italian painting, it is of considerable importance in the history of art; it is a simple rectangular oblong, with a vaulted roof: 132 feet 8 inches long, 43 feet wide, and 57 feet 10 inches high. Pintelli executed several other important works for the pope. Between the years 1472–77 he erected the church and convent of Santa Maria del Popolo. About 1473–75 he built the old Library of the Vatican. He restored the Hospital of Santo Spirito in Sassia, which was burnt down in 1741. He built also the Ponte Sisto over the Tiber; the churches San Pietro in Vinculis, Sant' Agostino, Santa Maria della Pace, and Sant' Apostolo (since rebuilt); and probably San Pietro in Montorio and San Jacopo were built from his designs. In 1484 he went to Urbino to continue the ducal palace of Urbino, which Luciánus Lauranna of Slavonia had been engaged upon from 1468 until 1483, for Federico II., duke of Urbino. Pintelli may have remained at Urbino until 1491, when he built the church of Santa Maria delle Grazie at Sinigaglia, for the Duke Giovanni della Rovere. He probably died at Urbino.

PINTURI'CCHIO, BERNARDI'NO, born in 1454 at Perugia, was a disciple of Pietro Perugino. He painted chiefly history, and also grotesque subjects, but he likewise excelled in portraits. He executed numerous works in Rome and other cities of Italy: his manner was singular; he not only finished his paintings very highly, but endeavoured to give them unusual splendour, by introducing rich gilding blended with architectural ornaments. His most celebrated performance is the history of Pius II., painted in ten compartments, in the library of Siena, in which Raphael, then a very young man, and his fellow-student under Pietro Perugino, gave him some assistance. He died in 1413.

PINUS, a genus of Gymnospermous Exogens, consisting for the most part of timber trees, inhabiting various temperate countries in the northern hemisphere. They are commonly called Pine Trees, and are distinguished from the Firs by their leaves, always evergreen and needle-shaped, growing in pairs, threes, fours, or fives, surrounded by a membranous sheath at their base. The following are the most remarkable species of this genus.

1. The Scotch Pine (*Pinus sylvestris*), furnishes the red deal of the carpenters, and in Scotland, the climate of which country is particularly suited to it, the trees often acquire a great size, and highly picturesque appearance. It is however asserted that the quality of its timber is much deteriorated by being grown in warm districts.

2. The Dwarf Pine (*Pinus pumilio*) is probably an alpine form of *P. sylvestris*.

3. The Hooked Pine (*P. uncinata*) is extremely valuable for its hardiness and the great durability of its timber. The *P. Mughus* is apparently the same plant.

4. The Red Pine (*Pinus resinosa*), a red-barked tree of large size from the northern parts of North America. The wood is fine-grained and of a close texture, and is highly esteemed in Canada for strength and durability.

5. The Aleppo Pine (*Pinus Halepensis*), a beautiful species, found wild in the western parts of Europe, from Genoa to Constantinople, and also throughout Syria. It grows fast, and is at once known by its fine light green-foliage; but its wood is not of much value, and it does not bear the climate of England well.

6. The Calabrian Pine (*Pinus Bruttia*), a very handsome tree, inhabiting Calabria, and said to yield timber of excellent quality.

7. The Banks' Pine (*Pinus Banksiana*), an ugly tree, from the most southern parts of North America, where it is called the Scrub Pine and the Gray Pine. Its timber seems to be of little value, except for the construction of canoes, for which its lightness and toughness render it well adapted.

8. The Pyrenean Pine (*Pinus Pyrenaica*), a Spanish plant, inhabiting the Sierra de Segura, above the limits of the Aleppo Pine, on the Pyrenees, and elsewhere. Its timber is said to be of excellent quality, and to have been used largely in the Spanish marine.

9. The Pallas Pine (*Pinus Pallasiana*), a fine tree from the central parts of the Crimea. Wood resinous and durable, but difficult to form into good planks on account of being unusually knotty.

10. The Stone Pine (*Pinus Pinea*), an in-

habitant of the southern parts of Europe and the Levant, where the wood is often used in ship-building, and the seeds, which are large and like nuts, are eaten. On the latter account it has accompanied Europeans in their migrations, and has now become common in many parts even of the southern hemisphere.

11. The Black Pine (*Pinus Austriaca*) is found among the rocks and precipices of southern Germany, and derives its name from the peculiarly dark colour of the foliage. The most sterile soil is said to suit it. The timber is reported to be valuable, but coarse; and to resist alternate dryness and moisture better than the larch.

12. The Corsican Pine (*Pinus Laricio*), a noble tree from the mountains of Corsica, Greece, Turkey, and Spain. It grows faster than any other known species, and produces excellent timber, similar in quality to red deal, but more brittle and less elastic. The French use it extensively in ship-building. The tree is now becoming common in this country.

13. The Cluster Pine (*Pinus Pinaster*), a noble species, inhabiting the most sterile sandy plains of France and southern Europe, especially along the coast. Its timber is soft, light, coarse, and only fit for very common purposes; but it affords a large quantity of resin and tar, and is much consumed in the manufacture of lampblack. It is this species that has been so successfully employed in fixing the loose drifting sand of the barren plains of some parts of France.

14. The Prickly Pine (*Pinus pungens*), a large tree. A native of Virginia and North Carolina. The timber seems to be of no value.

15. The Yellow Pine (*Pinus mitis*), a fine tree. A common inhabitant of the pine-forests of North America, as far north as Connecticut and Massachusetts. Its timber is of great value for domestic and naval architecture, provided the sap-wood, which is very perishable, is first removed. It is regarded as a most durable timber in this country.

16. The Jersey Pine (*Pinus inops*), a native of the more southern states of the American union. Its timber is of little use except for fuel. In this country it is usually a miserable-looking species, evidently unsuited to the climate.

17. The Canary Pine (*Pinus Canariensis*), a native of the mountains of Teneriffe and Canary, where it forms large forests, and often acquires an enormous size. The timber is said to be very resinous and durable. The species is too tender for England.

18. The Ocote Pine (*Pinus Ocote* or *Teocote*), a Mexican plant, of which little is known. It is found on M. Orizaba, and near Real del Monte, and forms a tree 100 feet high.

19. The Southern Pine (*P. australis* or *P. palustris*), a native of Virginia and the neighbouring states of America to the south, where it acquires the height of from 60 to 70 feet, with a trunk from 15 to 18 inches in diameter for two-thirds of its length. Its timber is of excellent quality, light, clean, and durable, and is extensively employed in ship-building, particularly for masts. It also yields abundance of tar. It is unfortunate that this, the handsomest and the best of the North American pines, should be too tender for the climate of England.

20. The Frankincense Pine (*Pinus tæda*), is said to acquire the height of 80 feet, in the *barrens* of Florida and Virginia, but not much known in England, where it seldom thrives. The timber is soft and perishable, but it yieldsa fragrant turpentine plentifully.

21. The Pitch Pine (*Pinus rigida*), is found in poor soil in most parts of the United States, and even inhabiting salt-marshes overflowed by the sea. It has a thickish dark-coloured bark, and, in consequence of the number of its branches, has an unusually knotted structure. The wood yields tar in abundance, but is coarse-grained and of inferior quality. When growing in swamps, it has little or no heart-wood.

22. The Pond Pine (*Pinus serotina*), an obscure species, probably not distinct from the Pitch Pine.

23. The Heavy-Wooded Pine (*Pinus ponderosa*), a large tree, with the habit of the Corsican pine. The growth of the tree is however inelegant, and its timber, though heavy and durable, very coarse.

24. The Sabine Pine (*Pinus Sabiniana*), a noble Californian tree, with a trunk from 110 to 140 feet high, and from 3 to 12 feet in diameter, clothed with branches to the ground, when standing far apart or solitary. The wood is white, soft, and not durable.

25. The Long-Leaved Pine (*Pinus longifolia*), an Indian species, inhabiting the valley and the lower hills of Nepaul. It is extremely beautiful, but too tender for the climate of England.

26. The Egg-Fruited Pine (*Pinus oocarpa*); from the pine-region of Mexico, and also from the warmer valleys, forming a tree from 30 to 40 feet high.

27. The Smooth-Leaved Pine (*Pinus leiophylla*), an inhabitant of the cold regions of Mexico. Nothing is on record of its habit.

28. The Montezuma Pine (*Pinus Montezumæ*), a native of the mountains of Mexico to the height of 11,000 feet above the sea.

29. The Thread-Leaved Pine (*Pinus filifolia*), a noble pine found in Guatemala by Mr. Hartweg. Nothing is yet known of its habits or timber.

30. The Acapulco Pine (*Pinus Acapulcensis*), is found in Mexico, in ravines near Acapulco, growing 50 feet high.

31. The False Weymouth Pine (*Pinus pseudostrobus*), a Mexican pine, with the habit but not the cones of a Weymouth pine, found very commonly at Anganguco, about 8000 feet above the sea.

32. The Bedford Pine (*Pinus Russelliana*), a native of Mexico, near Real del Monte.

33. The Hartweg Pine (*Pinus Hartwegii*), a Mexican tree 40 or 50 feet high.

34. The West Indian Pine (*Pinus occidentalis*), a native of St. Domingo, on the mountains where snow occasionally falls.

35. The Long-Leaved Pine (*Pinus macrophylla*), small tree from the north of Mexico.

36. The Mexican Cembra (*Pinus Cembroides* in *Llaveana*), a small Mexican tree, occurring in large forests, and producing seeds similar to those of the Stone Pines.

37. The Cembra Pine (*Pinus Cembra*), a tree of considerable size, inhabiting the sides of mountains in Siberia, Tartary, Switzerland, and Italy. It is very ornamental and hardy, grows tolerably fast, and produces a fragrant, fine-grained, soft wood, well suited for carvers and turners. The seeds yield a large quantity of oil of good quality.

38. The Weymouth Pine (*Pinus strobus*), a native of Canada, and others of the more northern districts in North America. It grows very fast, and produces the clean, soft, white, but perishable timber imported from America under the name of 'Pine.'

39. The Lofty Pine (*Pinus excelsa*), a fine Himalayan tree, bearing the climate of England without protection.

40. The Lambert Pine (*Pinus Lambertiana*), an enormous tree found by Douglas in New Albion, on sandy plains where no other vegetation exists. Specimens were found 200 feet high and more. The wood is spongy, and of no value except for fire-wood. The seeds are collected by the Indians for food.

41. The Ayacahuite Pine (*Pinus Ayacahuite*), a gigantic tree resembling the Weymouth Pine in habit; found by Ehrenberg near Omitlan, in Mexico, and by Hartweg in Guatemala. It produces an unusually large quantity of a clear, bright, amber-coloured resin.

PIOMBINO. [Siena.]

PIOMBO, SEBASTIANO DEL, was born in 1485, at Venice, whence he was called also Veneziano. His surname, according to Lanzi, was Luciano. He acquired the rudiments of painting under Bellini, but afterwards became the disciple of Giorgione, whose style of colouring he carefully studied and successfully imitated. The most famous of his portraits were those of Pope Clement VII., of Pietro Aretino, and of Giulia Gonzaga, the favourite of Cardinal Hippolito de' Medici.

Sebastiano was invited to Rome by Agostino Chigi, a rich merchant, by whom he was employed in ornamenting his palace of the Farnesina, in conjunction with Baldassare Peruzzi. It is said that Michel Angelo, growing jealous of the fame of Raphael, availed himself of the powers of Sebastiano as a colourist, in the hope that, assisted by his composition, Piombo might successfully rival the efforts of Raphael. Michel Angelo accordingly furnished the designs for the Pietà, in the church of the Conventuali at Viterbo; and the Transfiguration and the Flagellation in San Pietro, in Montorio, at Rome, the execution of which however, in consequence of Piombo's tedious mode of proceeding, occupied six years.

At this time Cardinal Giulio de' Medici commissioned Raphael to paint his picture of the Transfiguration, and engaged Sebastiano to paint a picture of the Raising of Lazarus, of the same dimensions. On this occasion, he was again assisted by the powers of Michel Angelo, by whom it was composed and designed. This picture is now in the National Gallery, London.

Sebastiano was greatly patronised by Pope Clement VII., who conferred upon him the office of keeper of the papal signet, which was the cause of his name, Del Piombo, in allusion to the lead of the seal. This post rendering it necessary that he should assume a religious habit, he in a great measure abandoned the profession of a painter, and was thenceforth called Fra Sebastiano del Piombo. He died at Rome, in 1547.

PIOUS USES. [Uses.]

PIOZZI, MRS., was the daughter of John Salusbury, Esq., of Bodvel in Carnarvonshire, where she was born in 1739. Her good looks and vivacity early acquired her distinction in the London world of fashion, which ended in her marriage, in 1763, to Mr. Henry Thrale, an opulent brewer in Southwark, and then one of the members for that borough. It was soon after she became Mrs. Thrale that her acquaintance with Dr. Johnson commenced. Thrale having died in 1781, his widow retired, with her four daughters, to Bath, and there married an Italian music-master, named Gabriel Piozzi, in 1784. A complete rupture with Johnson was the consequence. This did not prevent Mrs. Piozzi from publishing, in 1786, an octavo volume of gossip, entitled 'Anecdotes of Dr. Samuel Johnson, during the last Twenty Years of his Life.' Many things in this publication gave great offence to Boswell and Johnson's other friends. Mrs. Piozzi followed up her first book by another, in 1788, entitled 'Letters to and from Dr. Samuel Johnson,' in 2 vols. 8vo. Mrs. Piozzi's other principal works are—'Observations and Reflections made in the course of a Journey through France, Italy, and Germany,' 2 vols. 8vo., 1789; 'British Synonymy, or an Attempt at regulating the Choice of Words in Familiar Conversation,' 2 vols. 8vo., 1794; and 'Retrospection, or a Review of the most striking and important Events, Characters, Situations, and their Consequences, which the last Eighteen Hundred Years have presented to the view of Mankind,' 2 vols. 4to., 1801. Mrs. Piozzi survived her second husband, and died at Clifton, near Bristol, May 2, 1821.

PIPA. [Frogs.]

PIPE. A column of air contained in a tube and maintained in a state of vibration yields a musical sound, depending upon its length and (slightly) upon the state of the atmosphere.

Dr. Smith (1749), found, by comparison of an organ-pipe with a wire, that the D next below the middle A of the treble clef gave 254, 262, and 268 double vibrations per second in a cold day of November, a temperate day of September, and a warm day of August: taking 262 as the mean, this would give only 393 double vibrations for A instead of 430. If then all the experiments are trustworthy, the A of Dr. Smith's organ (at Trinity College, Cambridge) must have been nearly a tone below that of the orchestras of our day.

We shall first consider the pipe in a state (no matter how produced) of continued sonorous vibration, yielding the lowest note which it will give:

let it be a simple pipe open at both ends, and let it be sounding, say the c of the treble clef next below the A above mentioned, or the first below the lines of that clef. This note requires 258 double vibrations per second, A requiring 430. If we now remember that the air at the two extremities is in communication with the outer air, we see that no condensation or rarefaction can take place at those extremities, or only very small ones compared with those which take place in the interior of the tube. To get approximately at the conditions of vibration, let us suppose that no condensation or rarefaction takes place at the extremities. We then see that the state of the pipe, its two extremities never being condensed or rarefied, is as it would be if two waves of sound were travelling in opposite directions, every particle of the interior being affected by the joint condensations and velocities of both. Moreover, the distance between two uncondensed particles is always the whole length of the wave of condensation or that of rarefaction, or a multiple of this length; that is, the pipe must be either the half-length of a double wave or a multiple of this half-length. When the pipe sounds the lowest note, it must give the longest wave; that is, the length of the pipe must be that of the simple wave of condensation or rarefaction. Hence the lowest note which a pipe can yield, which is called its *fundamental* note, is that belonging to a double wave of sound which is double its length. Each double wave answers to a complete or double vibration of a string.

To compare this result with practice, let us suppose sound to travel at the rate of 1125 feet per second (temperature 62° Fahr). The note c having 258 double vibrations per second, this 1125 feet must contain 258 double waves, or each double wave must be 4.36 feet. The single wave then is 2.18 feet, or 2 feet 2 inches and .36 of an inch, which is the *theoretical* length of the pipe. Now the organ-builders say 2 feet, but this of course is a rough description, since the French organ-builders also say 2 feet (according to Biot), and the French foot is longer than the English. But the more exact descriptions give 2 feet 2 inches as the length of this c in an open pipe (the dulciana), and 1 foot 1 inch in a stopped pipe (the stopped diapason), which ought to be half as long as an open pipe.

We have seen that we may suppose the extremities of the open pipe to contain between them 2, 3, &c., half-waves, which, the whole pipe being one half-wave in length, will give the harmonics of the fundamental note.

Let us consider the case of a pipe with one end closed. It is obvious now that the open extremity is a point of no condensation, while the closed extremity must be a node, or point of no velocity. Hence the tube must be the half of an odd number of simple waves in length, twice the tube must be an odd number of simple waves, and four times the tube an odd number of double waves in length. Hence the fundamental note belongs to a double wave of four times the length of the tube; so that the fundamental note of a pipe closed at one end is an octave lower than that of the same pipe open at both ends. It is the same thing to say that a pipe of half the length of an open pipe, closed at one end, gives the same note as the open pipe. This is the reason why the pipes of the stopped diapason stop of an organ are halves of the lengths of those of the open diapason.

Again, since the double length of the pipe is an odd number of simple waves, the harmonics which the pipe can yield are not the complete set yielded by the open pipe of double the length, but every other one, beginning from the fundamental note. The number of vibrations per second being 1, those of the harmonics producible by the pipe closed at one end, are 3, 5, 7, &c.

It is also to be noted that the whole of the preceding theory is but an approximation. The extremities of the open tube are not points of absolute non-condensation and non-rarefaction, but points at which the condensations and rarefactions are least and small. Similarly, the nodes are not points in which the air is absolutely at rest, but points at which the motion is least.

PIPE (measure), a name given to two hogsheads of the old wine measure. Two hogsheads of ale or beer were called a butt. [HOGSHEAD.]

PIPE-OFFICE, or more properly the Office of the Clerk of the Pipe, a very ancient office in the Court of Exchequer. It was formerly at Westminster, but was removed to Somerset House towards the close of the last century, where the duties of the office were performed, and where the records belonging to it were kept, till the abolition of the office of clerk of the pipe, and with it that of the comptroller of the pipe, by the act 3 & 4 William IV. c. 99. By that act the records which had been accumulated in the performance of the duties of this office were transferred to the custody of the *king's remembrancer* of the exchequer.

As to the name of Pipe applied to this office and to the great roll of the exchequer, one conjecture is, that the rolls are so called because in form they resemble pipes; another that they were transmitted through a certain pipe from one room of the exchequer to another. It may be considered an undecided question.

PIPER BETLE, Linn. The leaves of this species are much used by the natives of the East Indies, to chew along with the nut of the Areca Catechu and quick-lime, as a restorative of the powers of the stomach and promoter of digestion. It is capable however of producing, like some other species of *Piper*, intoxicating effects, and should be used in moderation.

PIPER CUBE'BA, Linn., is generally regarded as the source of the officinal Cubebs; but, according to Blume, *P. canicum*, Rumph., which is the *P. cubeba* of Roxburgh, yields the greater portion of the cubebs of commerce. The fruits of both are stalked, but that of the former is larger and has more pungency than the latter. Both are common in Java, where, as in other parts of India, they are used as a grateful condiment, as common pepper is in Europe. They are also employed medicinally in the same complaints as give them repute in Europe.

PIPER LONGUM, a native of the East Indies, the female spike of which, having attached to it the dried half-ripe berries (resembling the catkin of the birch), is used in medicine. It has nearly the same chemical composition and properties as black pepper, though feebler. It is said to contain *Piperin*. The root is employed by the Hindoos, but it is still weaker than the fruit.

PIPER NIGRUM, Linn., a climbing plant of the East Indies, and very extensively cultivated there. The best pepper comes from Malabar, the least esteemed from Java and Sumatra. The berries are gathered when yet green, before they are perfectly ripe, and quickly dried on mats, by which they turn black. When plucked too young, they speedily fall into a state of powder. These are separated from the others by sieves and winnowing. In this condition it is termed Black Pepper. White Pepper is the same fruit freed from the outer rind: for this purpose, the ripe berries are macerated and the husk is removed.

PIPERA'CEÆ, a small natural order of incomplete Exogens. The general properties of the order are aromatic, as in the peppers of the shops. [PIPER.]

PIPERIN, a peculiar principle of black popper. It appears in the form of pale straw-coloured four-sided prisms, which have but little taste, are insoluble in cold water and slightly soluble in hot water; readily soluble in alcohol, less so in æther.

PIPING CROW. [BARITA.]

PIPIT, the popular English name for the birds of the genus *Anthus*. Thus *Anthus arboreus* is the Tree-Pipit; *Anthus pratensis*, the Meadow-Pipit, or Titlark; *Anthus petrosus*, the Rock-Pipit; and *Anthus Richardi*, the Richard's Pipit, of British Ornithologists. The pipits were generically separated from the true larks by Bechstein. They are insessorial birds, intermediate between larks and wagtails, belonging to the same section, *Dentirostres*, with the latter, but have the general aspect of the former.

PIPOWDER, COURT OF, a court held for the decision of matters arising at a fair or market. The court having been instituted chiefly for the convenience of the itinerant dealer, in Norman French 'pied pouldreux,' was called the Court of Pipowders, 'Curia Pedis Pulverizati.' This court has been encroached upon by the superior courts till it has fallen into nearly total disuse.

PIPPI. [GIULIO ROMANO.]

PI'PRIDÆ, the name given to a family of *Dentirostres*, by Mr. Vigors, who remarks that those birds which we denominate Chatterers, and which form the genus *Ampelis* of Linnæus, are usually assigned a place near the family *Meruliдæ*; and he confesses that, from the general affinity they appear to bear to it, he had felt, and when he wrote his valuable paper 'On the Natural Affinities that connect the Orders and Families of Birds' ('Linn. Trans.,' vol. xiv.), did, it is plain, still feel, considerable doubt whether this was not their natural station. A strong affinity however, on the other hand, seems, he observes, to unite them with the wide-gaped *Pipræ*, and some of those other groups which, by their bill, broad and depressed at the base, appear to come in contact with the earlier divisions of the *Meruliдæ*, and the extremes of the *Fissirostres*, which precede it. The general rule of placing groups in a conterminous situation, according to what appears to be the predominance of their more important characters, inclined him however to arrange the birds of which he speaks provisionally among the *Pipridæ*, at the extreme termination of the *Meruliдæ*. In his view of the case at that time, the characters in which they accord with that family, and approximate the extreme groups of the preceding tribe (*Musicapidæ*), appear to predominate. More accurate knowledge, he adds, will clear away these and similar difficulties.

Mr. Swainson does not admit the family *Pipridæ*, but he makes the *Piprinæ* a subfamily of the *Ampelidæ*. [PIPRINÆ.]

PIPRI'NÆ, Mr. Swainson's name for the Manakins, which he makes a subfamily of the family *Ampelidæ*, Fruit-Eaters, or Chatterers, and thus characterises:—

Size small. Feet lengthened, slender, weak. Bill very short: the upper mandible much curved.

Mr. G. R. Gray makes the *Piprinæ* the second subfamily of the *Ampelidæ*, *Pachycephalinæ* being the first; and he arranges under it the following genera:—

1. *Phœnicircus*, Sw. (*Pipra*, Wagl., *Ampelis*, Linn., *Querula*, Cuv.) 2. *Melopia*, Sw. (*Pipra*, Licht.) 3. *Pipreola*, Sw. 4. *Pipra*, Linn. (*Manacus*, Briss.) 5. *Pipracidea*, Sw. 6. *Iodopleura*, Sw. (*Pardalotus*, Less.) 7. *Calyptura*, Sw. (*Pardalotus*, Vieill., *Regulus*, Licht.)

PIQUET, a corps of troops detached from the main body of an army, when in position or in cantonments, and disposed about it in parties so as to form a chain of outposts for its security.

As an army depends for its safety upon timely notice being obtained of the movements of the enemy, in order that it may prepare itself to repel an attack, it is of the utmost importance that the advanced posts should be disposed in such a manner that they may mutually support one another, and that none of them may be cut off by parties of the enemy passing unobserved between them. The chain must of course entirely surround the position, unless the latter should in any part be secured by rivers or by some other obstacles which it may be impossible for the enemy to pass or turn. The nature of the ground determines the class of troops which should be employed; but in general both cavalry and light infantry are appointed together for the outpost duty. In an open country the former may be numerous, but in one much inclosed or abounding with obstructions the latter alone can act efficiently.

PIRACY, PIRATE (immediately from the Latin *pirâta*, and remotely from the Greek πειρατὴς, which had the same signification as our word pirate).

The offence of piracy by the common law of England consists in committing those acts of robbery and depredation upon the high seas, which, if committed upon land would have amounted to felony there. (4 Blacks., 72.)

By statute some other offences are made piracy, as by stat. 11 & 12 Wm. III. c. 7. The dealing in slaves on the high seas is piracy, and subjects a person to transportation for life or not less than fifteen years, or to be imprisoned for not exceeding three years. (5 Geo. IV. c. 113; 1 Vict. c. 91.)

Persons guilty of piracy were formerly tried before the judge of the admiralty court, but the stat. 28 Henry VIII. c. 15, enacted that the trial should be before commissioners of oyer and terminer, and that the course of the proceedings should be according to the law of the land. Further provision was made with respect to the trial of offences on the high seas by the statutes 39 Geo. III. c. 15; 43 Geo. III. c. 113; 46 Geo. III. c. 54; and now, by the stat. 4 & 5 Wm. IV. c. 36, s. 22, the trial of offences committed on the high seas is in the Central Criminal Court. Piracy is in some cases punished with death, in others by transportation.

PIRANE'SI, GIOVANNI BATTISTA, born at Venice in 1720, was sent by his father (who was a mason) to study architecture at Rome, from whence he refused to return; and, being thrown upon his own resources, the young artist soon after (1741) brought out his first work on triumphal arches, bridges, and other architectural remains of antiquity. This production instantly established his reputation, the engravings being treated with such mastery, and being altogether so decidedly superior to any former representations of similar subjects, as to make an epoch in chalcography and architectural delineation. Piranesi's usual practice was to draw his subject at once upon the plate itself, and complete it almost entirely by etching in aquafortis, with very little assistance from the graver. Hence his works are marked by a freedom and spirit that can otherwise hardly be preserved. The same circumstance also accounts for that astonishing rapidity of execution which enabled him to produce, within less than forty years, about two thousand engravings, most of them of very large dimensions and full of detail.

The following is a list of his principal works:—'Architectura Romana,' 208 plates, 4 vols., atlas folio; 'Fasti Consulares Triumphalesque Romanorum;' 'Antichità d'Albano,' 35 plates; 'Campus Martius,' &c., 54 plates; 'Magnificenza dei Romani,' 44 plates; 'Vedute di Roma,' 2 vols., 130 plates of modern buildings at Rome; 'Collection of Candelabra, Vases,' &c.; 'Collection of Chimney-Pieces,' a series of most splendid designs; 'Carceri d'Invenzione,' 16 plates, filled with exceedingly wild but most picturesque conceptions; 'A Collection of Ancient Statues and Busts,' 350 subjects; 'The Trajan and Antonine Columns;' 'Antiquities of Herculaneum and Pompeii.' A complete set of his works (comprising many not here enumerated) amounts to no fewer than 29 folio volumes.

Piranesi did not execute much as a practical architect; but among the churches which he was employed by Clement XIII. to repair or rebuild are those of Santa Maria del Popolo and the priory of Malta. It is in this last-mentioned edifice that a monument by Angolini, a life-sized statue of him, has been erected to his memory. Piranesi died at Rome, Nov. 9, 1778.

PIRATE. [PIRACY.]

PIRIME'LA, Dr. Leach's name for a genus of Crabs, placed by M. Milne Edwards among the *Cancériens Arqués*, or those crabs which have no clypeiform prolongation on the sides of the carapace, which is much wider than it is long, arched in front, and strongly truncated on each side posteriorly.

Example, *Pirimela denticulata*. Locality, coasts of Europe (England, France, &c.).

PIRMASENS, a well-built fortified town in the Bavarian Rhein-Kreis, 24 miles W. from Landau, has 5600 inhabitants, a gymnasium, and a synagogue. The manufactures are—tobacco, straw-hats, ground glass, shoes, and musical instruments.

PIRNA, a town in the kingdom of Saxony, situated on the left bank of the Elbe, 12 miles by railway S.E. from Dresden, has 5596 inhabitants. Most of the houses are built of stone from the celebrated quarries near the town. The principal public buildings are—the town-hall, the gothic cathedral, the convent church, the church of St.-Kunigunda, and the orphan asylum. On a high rock near the town, called the Sonnenstein, there is a strong fortress, which has been sometimes used as a lunatic asylum. There are manufactures of cotton, linen, woollen cloths, earthenware, tobacco, leather, ironmongery, starch, &c. Calico-printing is carried on. Hops are largely grown in the neighbourhood of Pirna. A few miles N. of this town, and 5 miles from Dresden, on the right bank of the Elbe, is the fine palace of *Pillnitz*, the summer residence of the royal family of Saxony.

PIROLI, TOMMA'SO, a distinguished Italian designer and engraver, was born at Rome in 1750, and died in that city in 1824. He was the pupil of G. B. Piranesi. Among Piroli's numerous prints, which are mostly etched in outline, and many in chalk manner, the following are the most interesting:—The Prophets and Sibyls of Michel Angelo in the Capella Sistina, in large slightly-shaded outlines; a copy of Metz's prints from the Last Judgment in the same chapel; the story of Cupid and Pysche, from the frescoes of Raphael, in the Farnesina; the frescoes of Masaccio in the Brancacci Chapel at Florence, and the original editions of Flaxman's outlines to Homer, Hesiod, Æschylus, and Dante, which were first published at Rome. His drawing is correct and his line firm. There are also several sets of engravings, after remains of ancient art, by Piroli, some of which were published at Rome and at Paris, by Francesco and Pietro Piranesi, sons of the celebrated G. B. Piranesi.

PIRO'N, ALEXIS, born at Dijon, in 1689, studied the law, took his degrees, and practised as an advocate in his native town, but he afterwards forsook the bar, and lived for a time in gay and dissipated society. Being distressed in his circumstances, he repaired to Paris and employed himself as a copyist, and afterwards produced several light comedies and farces, which succeeded very well, but he failed in his attempt

to write tragedy. At fifty years of age he composed his drama 'La Métromanie,' the best of his works. He wrote also Tales, Odes, and other light poetry, most of them grossly licentious, according to the prevailing taste of his age, which was that of the reign of Louis XV. Montesquieu obtained for Piron a pension from the king of 1000 livres. Piron died in 1773. His works were collected without discrimination, and published by Rigoley de Juvigny, 7 vols. 8vo. Piron however, before his death, had expressed his regret at the publication of some of his more indecent odes, which had proved a bar to his being received among the members of the Académie Française, an honour which he had sought, although he affected to disdain it in his writings.

PISA. The *Province of Pisa*, one of the administrative divisions of Tuscany, is bounded N. by the duchy of Lucca, E. by the province of Florence, W. by the sea, and S. by the Compartimento of Grosseto. The province of Pisa comprises: 1, The lower part of the basin of the Arno, with a small part of that of the Serchio. 2, A hilly range, called Montenero, which bounds the basin of the Arno on the south, and runs close to the sea south-east of Livorno. 3, The basin of the Cecina, south of the hills just mentioned. 4, A strip of land south of the mouths of the Cecina, and extending along the sea-coast and between that and the hills for about 12 miles, as far as the Torre S. Vincenzo. 5, The island of Elba, which is attached to the administrative province of Pisa. 6, Several detached districts, situated to the north between the territories of Lucca, Modena, and Parma; and comprising Barga, Bagnone, Fivizzano, and Pontremoli. The area of the whole province of Pisa is about 1350 square miles, and the population in 1844 was 354,806. It is divided into 15 districts, containing in all 53 communes. The districts are: Pisa, Livorno, Rosignano, Guardistalo, Pomarance, Peccioli, Pontedera, Lari, Vico Pisano, Barga, Bagnone, Fivizzano, Pontremoli, Pietrasanta, and Porto Ferrajo, or Elba. The principal towns are: Pisa, Livorno, and Porto Ferrajo. [Elba.]

PISA, one of the principal towns of Tuscany, is situated in a plain, through which flows the Arno, 45 miles W. from Florence, 13 miles N. by E. from Leghorn, and about 4 miles from the sea-coast. The town is divided by the river into two nearly equal parts, connected by three bridges. The circumference of the walls is about 6 miles; the quays along the Arno and several other streets are wide, well-paved, and lined with handsome buildings; but the town has an appearance of loneliness, and the grass grows in many of the streets. The population, which once exceeded 100,000, is now hardly 20,000. The four most remarkable buildings of Pisa, the Cathedral, Baptistery, Belfry, and Campo Santo, are grouped near one another in a vast open place at the western extremity of the town. The Duomo, or cathedral, begun in the 11th century, is a splendid gothic structure, cased externally with marble of various colours, and ornamented with numerous rilievos, inscriptions, and columns of various sizes, put together without much taste; but the dome, pulpit, and pictures are all worthy of admiration. The Baptistery, detached from the church, is round, and entirely cased with marble. It is ornamented by numerous sculptures; the pulpit in particular is considered a masterpiece of Niccolo Pisano. The Belfry, built in the 12th century, is a round tower, cased with marble, 190 feet high, which deviates from the perpendicular line about 14 feet. The Campo Santo, or cemetery, constructed in the 13th century, is a long parallelogram, 430 feet in length, with an arcade or cloister running all round the interior, the walls of which are covered with fresco paintings, chiefly by Giotto, Orgagna, and Memmi. The paintings are for the most part greatly damaged, and some are entirely obliterated. Several ancient sculptures and other remains of antiquity are deposited in the Campo Santo.

The other remarkable buildings of Pisa are:—1, the church of San Stefano; 2, that of San Frediano, which is rich in paintings; 3, San Nicola, with a handsome belfry, the work of Niccolo Pisano; 4, San Michele in Borgo; 5, San Maria della Spina, with good paintings and sculptures. There are many other churches besides these. 6, The palaces of Lanfranchi and Lanfreducci; 7, the Torre della Fame, in which Ugolino and his children were starved to death; it now forms part of a structure called Palazzo dell' Orologio, on the Piazza dei Cavalieri; 8, the university buildings, the library, observatory, and botanical garden; 9, the great hospital; 10, the Loggia, or old Exchange. Near Pisa are the Certosa, or Carthusian convent and church; the vast farm and forest of the grand-duke at San Rossora; and the mineral baths of San Giuliano.

History of Pisa.—The early history of Pisa is obscure; but the town became subject to Rome about the middle of the fifth century of Rome, retaining, like most Etruscan towns, its municipal form of government. After the fall of the Western Empire, Pisa passed successively under the dominion of the Goths, the Longobards, and the Carlovingians. Under the last it governed itself, like most other Italian towns, as an independent community under a nominal allegiance to the emperors and their great feudatories the counts or marquises of Tuscany. The town rose in importance, and maintained many contests with its neighbours, and with the Saracens. In the beginning of the 11th century Pisa was a republic, having its annual consuls, but it appears that the bishop had also a considerable share in the administration. During the same century the Pisans extended their fame and their territory by numerous maritime engagements; and in the year 1070 began the wars between Genoa and Pisa, which continued, with various interruptions, for more than two centuries, and ended in the downfall of Pisa. Commercial jealousy, and the possession of Corsica, which the Genoese aimed at, were the causes of the war. It was in the 12th century that the Pisans attained their greatest prosperity, and completed some of their splendid monuments of art. The Pisans sent a fleet of 120 sail to the first crusade, and their soldiers and sailors

assisted at the taking of Nicæa, and afterwards at that of Antioch. In the war between Frederic Barbarossa and the Lombard cities, Pisa sided with the emperor, and afterwards sent a fleet of fifty galleys to accompany him to the Levant on his crusade. In the following century the Pisans, as Guibelines, took the part of Frederick II. against the pope. In 1258 peace was made between Genoa and Pisa, through the mediation of Pope Alexander IV. The great contest between Pisa and Genoa, which put an end to the high rank of the former as a maritime power, took place between 1284 and 1290.

Pisa had its full share in the intestine commotions of Italy. It contended with Lucca, Genoa, and especially Florence, and was also distracted by perpetual feuds between the democratic and aristocratic parties within the city itself. Its career as an independent state ended in 1406, by the capture of the city by the Florentines. After eighty-nine years of Florentine dominion, when Charles VIII. of France came to Italy, in 1494, and showed himself hostile to Florence, the people of Pisa, headed by Simone Orlandi, rose in arms, drove away the Florentines, and restored their republican government under the protection of France. In 1499, after the French had left Italy, the Florentines besieged Pisa, but were repulsed, the women themselves assisting their townsmen in repairing the fortifications. In 1504 the Florentines resumed the siege, but they failed again. At last, in 1509, they formed a close blockade round the town, and Pisa was obliged to surrender through famine. Since that time Pisa has remained subject to Florence or to the rulers of Florence and of the rest of Tuscany.

The university of Pisa has been the chief means of maintaining some life in the town. It is divided into three faculties, theology, law, and medicine; it reckons among its professors several distinguished men, and is attended by about 400 students.

PISA'NO is the surname of four distinguished artists of Pisa in the 13th century, namely, Giunta, Niccolo [NICCOLO DI PISA], Giovanni, and Andrea.

Giunta Pisano, the earliest known Tuscan painter, may have been born about 1180 or 1190. There are still some remains of the paintings of Giunta in the upper church of San Francesco at Assisi. Other existing works ascribed to Giunta are—a Crucifixion in San Ranieri at Pisa, and a picture (a panel) of Saints in the Chapel of the Campo Santo, which was built or commenced by *Giovanni Pisano* in 1278. Giunta was contemporary with Guido of Siena and Bonaventura Berlingieri of Lucca; and they all belong to the Byzantine school in style.

Andrea Pisano was born in 1280, was distinguished as architect and sculptor, and particularly as a metal founder, in which art he was the first of his age. He is said by Vasari to have imitated the design of Giotto in the Campo Santo. He was invited early to Florence, where he executed several celebrated works. His great work in sculpture however was the bronze gate for the Baptistery of St. John, which he undertook to make from a design by Giotto. He died in 1345. Andrea's son, Nino, completed the unfinished works of his father, and executed many original works of merit. Tommaso Pisano, another pupil of Andrea, is supposed also to have been his son.

PISCES (the Fishes), the last constellation of the old zodiac. There is in the mythological stories (which are unworthy of note) a confusion between this constellation and Piscis Australis presently to be noticed. (See Grotius, in his notes on Aratus.) The constellation consists of two fishes linked by a string attached to their tails: they are not close together, the upper one being close to Andromeda, the lower one under the wing of Pegasus. The rectangular figure mentioned in PEGASUS will be a guide to the position of the two fishes: the line of α Andromedæ and γ Pegasi being parallel to the body of one fish, and that of γ Pegasi and α Pegasi to the body of the other.

PISCI'DIA, a genus of plants belonging to the natural order *Leguminosæ*. The species are West Indian trees, with broad unequally pinnate leaves and terminal panicles of white and red flowers mixed. *P. erythrina* (Dogwood) is a tree about twenty feet high. This plant possesses the peculiar property of intoxicating fish: the bark of the root is the part used. It is said to be an effectual remedy for mange in dogs: it is also reputed to possess tanning qualities. This is one of the best timber-trees in Jamaica; the wood is coarse, heavy, resinous, and almost imperishable, lasting equally well in or out of water; hence it makes excellent piles for docks and wharfs. *P. Carthaginensis* is a native of Jamaica, Guadaloupe, and Carthagena, on the mountains. It is scarcely distinguishable from the former species.

PISCIS AUSTRA'LIS or AUSTRI'NUS, or NO'TIUS (the Southern Fish), one of the old constellations situated directly under Aquarius. The stream from the water-pot of the latter constellation finishes at the mouth of this fish. It contains a remarkable star of the first magnitude, Fomalhaut, which only just rises above the horizon in these latitudes; when on the meridian, it is nearly in the same vertical circle with α and β Pegasi.

PISCIS VOLANS (the Flying-Fish), one of Bayer's southern constellations, situated between the South Pole and Argo.

PISI'DIA formed the northern part of the Syrian and Roman provinces of Pamphylia. [PAMPHYLIA.] The name of Pamphylia was confined to a narrow slip of land along the sea-coast. The mountainous country inland was called Pisidia. In these mountains, which form a part of Mount Taurus, the Pisidians maintained their independence under the Persian Empire. Neither the Syrian kings nor the Romans were able to subdue them. In the time of Strabo the Pisidians were governed by petty chiefs, and principally supported themselves by plundering their neighbours.

We know very little of the physical geography of Pisidia, or of the situation of its towns. Mr. Fellows, who visited the western part of the country in 1838, informs us ('Excursion in Asia Minor,' p. 165) that the rocks are generally of

marble, and some of common limestone with veins of marble running through them in all directions. Mr. Fellows states that 'the most singular features in this district are the mountains of volcanic dust, which he saw 10 miles distant, looking as if they were smoking; this appearance being caused by the sand, which with every little wind is blown into clouds, and carried into the air and along the valleys. Out of these hills rise jagged points of marble rocks, each of which forms a nucleus of the drifting sand. The whole of this light sand or dust is tufa, the dust of the pumice-stone, and a volcanic production; the decomposed lime has in many parts mixed with this tufa and formed hills of Roman cement.' The chief towns of Pisidia were Antiocheia, Sagalassus, and Selge. Antiocheia became a Roman colony. It was visited by St. Paul and Barnabas. The site is uncertain. The ruins of Sagalassus are very extensive, consisting of temples, a theatre, and other remains: the place is called Boodroom by the Turks. South-east of Sagalassus was Selge, the chief town of Pisidia. Mr. Fellows visited some magnificent ruins, about ten miles north-east of the village of Boojak; and these remains probably mark the site of Selge.

PISISTRA'TIDÆ. Hippias and Hipparchus were the two sons of Pisistratus, after whose death Hippias, the elder, succeeded to the rule.

Thucydides gives the brothers a character for encouraging manly virtue and cultivation, for success in war, for piety, and for lenity in taxation.

Hipparchus, the younger son, made offers of a degrading nature to Harmodius, a young Athenian, and, meeting with a repulse, insulted his sister by refusing her admittance to a procession on the score of unworthiness. Harmodius resented the double indignity, and formed a plan with his friend Aristogeiton and some others to relieve themselves from so hateful a tyranny. Hippias was their first object, but, finding themselves detected, they attacked Hipparchus, and killed him. The other conspirators were detected. Hippias now changed popular manners for suspicious cruelty, and at the same time took measures for ingratiating himself with Darius, king of Persia. In the fourth year of his rule he was expelled, with Spartan aid, by the fugitive Alcmæonids, and retired to Sigeum on the Hellespont, thence to Lámpsacus, and lastly to the court of Persia, to return again in old age as the companion of the enemies of Greece, and to witness their overthrow at Marathon nineteen years afterwards.

PISI'STRATUS, son of Hippócrates, lived at the same time with Crœsus, king of Lydia, and ruled over Athens in that fashion which was then called by the name of tyranny; a term which by no means implies tyranny in the modern sense. He was the friend and relation of Solon, and, during the lawgiver's absence, had formed and led one of the three parties into which Athens was then split. In 560 B.C., *Pisistratus* drove into the market-place himself and his mules marked with wounds inflicted by his own hand. He attributed these wounds to the enemies of the people, whose friend he was, and asked and obtained a guard, with which he made himself master of the Acropolis. Not long afterwards the other two factions joined, and drove him out. A new quarrel between Mégacles and Lycurgus proved the means of his recall, and he strengthened himself by taking a daughter of Mégacles for his second wife. As one of the Alcmæonids, she was held to be stricken with a curse, and Pisistratus slighted her. He was again expelled, and continued in exile for about thirteen years, at the end of which he landed at Marathon, took his foes by surprise, routed them, spared the fugitives, and became master of Athens. He strengthened himself by foreign and native mercenaries, by gaining the favour of the poor, and taking hostages of the rich, and ruled till his death, which took place B.C. 527.

To Pisistratus were owing the first steps in art taken at Athens, the first important public buildings, and a tax on the rich to defray the expense of public buildings, and lastly the first library, and the collection (as it is said) of the poems of Homer.

PISOGNE. [BERGAMO.]

PISTA'CHIA NUT, the fruit of the *Pistacia vera* of botanists, is the produce of a small tree, or large bush, from 15 to 20 feet high. The tree is originally from Asia Minor, but is now naturalised all over the South of Europe, where the fruit is in request for confectionary and for the dessert.

PISTIL. [ENDOCARP.]

PISTO'IA, the ancient *Pistorium*, a town in the Tuscan province of Firenze, is situated 20 miles N.W. from the city of Florence, in a plain at the foot of the Apennines, and near the Stella, a tributary of the Ombrone, which is an affluent of the Arno. Pistoia lies on the high road leading from Florence to Modena over the Apennines. It is a well-built town of considersble size, but rather thinly inhabited; it contains abont 12,000 inhabitants, and gives title to a bishop. Pistorium does not appear to have been a place of importance under the Romans, except that it was near one of the passes leading into Cisalpine Gaul. Sallust mentions the Pistorian territory in his account of the movements of Catiline and his insurgent followers. Pistoia was a place of importance under the Longobards, whose king Desiderius inclosed it with walls. It was afterwards an independent municipality, until it was subjugated by Florence, about A.D. 1150. In the bloody feuds of the numerous branches of a distinguished Pistoian family, named Cancellieri, in the latter part of the 13th century, the two factions of the Bianchi and the Neri originated, which spread also to Florence, and caused incalculable misery to both cities in this and the following century. The Florentine Neri blockaded Pistoia, and after terrible barbarities got it into their power by surrender, April 10, 1306, when they razed the walls to the ground. Pistoia never recovered from this blow. It has continued, with some short interruptions, to be subject to Florence ever since.

There are many remarkable buildings in Pistoia. The cathedral, which was built by the Countess Matilda, in the early part of the 12th century, and restored by Niccolo di Pisa, contains some good paintings, basso-rilievos, and monuments. The other churches worthy of notice are

San-Pietro-Maggiore, L'Annunziata, San-Filippo-Neri, Santa-Maria-dell'Umiltà, San-Giovanni-Battista, San-Domenico, and San-Giovanni-Rotondo. The palace del Commune, or degli Anziani, dates from the 13th century, and contains several monuments of the middle ages. The episcopal palace and the clerical seminary, both built in the last century by bishop Ricci, are handsome buildings. La Sapienza, or the public schools, has a good library. There is also at Pistoia an academy of sciences and belles-lettres. The private palaces of the families Bracciolini, Cancellieri, Rospigliosi, Tolomei, and Forteguerri, contain good paintings. The chief manufactures are—woollen cloth, silk, leather, iron wares, and gun-barrels. The pistol is said to derive its name from this city. Pistoia was the birth-place of Pope Clement IX.

PISTOL. [Arms.]

PISTOLE. [Money.]

PISTON. [Hydraulics.]

PISUM. [Pea; Vicieæ.]

PITCAIRN'S ISLAND is a small island in the Pacific, the centre of which is in 25° 3′ 37″ S. lat. and 130° 8′ 23″ W. long. It is about seven miles in circumference, and very high, with precipitous sides, and without anchorage. Some of the rocks are volcanic. The highest point of the island is 1109 feet above the sea-level. The island, which was discovered by Cook in 1777, now contains a colony of Englishmen and Otaheitan women, whose offspring form the whole population of the island. [Bligh.] Fletcher Christian settled there in 1790. The descendants of that remarkable colony are a fine and robust people, high-spirited and intelligent, and speak both the Taheitan and English languages fluently. Fruits, vegetables, domestic animals, and fish, are abundant.

PITCAIRNE, ARCHIBALD, M.D., was born at Edinburgh in 1652. He studied divinity, and afterwards law at that university; but being obliged by the failure of his health to go to Montpellier, he there acquired an inclination for the science of medicine, which he soon afterwards studied in Paris, and thence returning to his native place, there obtained a very extensive practice. In 1692 he was invited to the professorship of medicine at Leyden; but he held the appointment little more than a year, and then returned home. While at Leyden the celebrated Boerhaave was among his pupils. Dr. Pitcairne died at Edinburgh in 1713.

Dr. Pitcairne's chief work was published after his death, under the title of 'Elementa Medicinæ Physico-Mathematica.'

PITCH. [Tar.]

PITCH, in Music, a tone or degree in musical sounds, whether grave, or acute, or intermediate. The pitch of every note is produced by a certain number of vibrations. [Pipe.]

PITCHSTONE, a siliceous rock of igneous origin, generally occurring in dykes which traverse the strata, or in overlying columnar masses. The colours are extremely various; the texture varies from almost glassy to granular, and thus allows of passage into hornstone.

PITH is a cellular substance found in the centre of the branches, but not roots, of Exogens. When young it is filled with fluid and with grains of starch, which gradually disappear as the foliage in communication with the pith becomes organised. In Endogens there is no pith, but the office of that part is probably performed by the cellular substance in which the fibro-vascular cords of woody matter are imbedded.

PITHIVIERS. [Loiret.]

PITISCUS, SAMUEL, was born at Zutphen, March 30, 1637, and in his younger days was the pupil of John Frederick Gronovius. He was appointed master of the public school at Zutphen in 1685, and about the same time was entrusted with the direction of the college of St. Jerome at Utrecht. This last employment he retained till 1717, when, being in his eightieth year, he resigned it. His most important works were his 'Lexicon Latino Belgicum,' of which an improved edition was produced by A. H. Westerhovius, Rotterdam, 1754; and his 'Lexicon Antiquitatum Romanorum,' 2 tom. fol., Leov., 1713. His editions of Quintus Curtius, Solinus, Suetonius, and Aurelius Victor, are well known to classical scholars. He died February 1, 1727.

PITS, or PITSEUS, JOHN, born at Alton in Hampshire, in 1560, received his early education at Winchester School, whence he was elected a probationer fellow of New College, Oxford, but in less than two years he became a Roman Catholic, and left the kingdom as a voluntary Romish exile. He went first to Douay. He afterwards held the professorship of rhetoric and Greek at Rheims. He was subsequently preferred to a canonry of Verdun. He was for twelve years confessor to the Duchess of Cleves, and after her death he went to Lorraine, and was promoted to the deanery of Liverdun, where he died in 1616. He had compiled 'The Lives of the Kings, Bishops, Apostolical Men, and Writers of England,' of which the fourth volume only, containing the lives of the writers, was published after his decease, in 4to., at Paris, 1619 and 1623.

PITT, WILLIAM, EARL OF CHATHAM, was the second son of Robert Pitt, Esq., of Boconnoc, near Lostwithiel, in Cornwall, by Harriet Villiers, sister of the Earl of Grandison (an Irish peer), and the grandson of Thomas Pitt, governor of Madras. William Pitt was born at Boconnoc, on Nov. 15, 1708. He was educated at Eton, whence he went in 1726 to Trinity College, Oxford. On leaving the university, he obtained a cornetcy in the Blues, and entered parliament in January, 1735, as one of the representatives for the borough of Old Sarum, which was the property of his family.

He immediately joined the opposition, of which the head at this time was Frederic, Prince of Wales, and the part he took in the debates led to his being deprived of his commission. For this loss however he was recompensed by being appointed by the Prince one of the grooms of his bed-chamber. He took an active and prominent part as a debater in the discussion of the successive motions directed against Walpole in January and February, 1741. During that time he

became eminently distinguished for his power of sarcasm, brilliant declamation, and imposing elocution. Walpole resigned in the beginning of Feb. 1742; the nominal head of the new ministry was Lord Wilmington; but when Walpole had contrived to drive Pulteney into the House of Lords, the real supremacy in the cabinet was divided, or rather contended for, between the secretary of state Lord Carteret and the two Pelhams, the elder of whom, the Duke of Newcastle, was the other secretary of state, his brother, Henry Pelham, being paymaster-general. Wilmington died in July, 1743, and although, by Walpole's advice, Mr. Pelham was appointed first lord of the treasury and chancellor of the exchequer, Carteret derived from the favour of the king a power really superior to that of his rival. In this state of affairs, Pitt threw himself again into opposition, and became more active and acrimonious in his denunciations of the new ministry than he had been against Walpole himself.

Carteret, now become Lord Granville, was dismissed a few days before the opening of the session of parliament in Nov. 1744; and what was called the *broad-bottom ministry* was formed, with Mr. Pelham at its head. But, although his friends George Grenville and Lyttelton both obtained places in the new arrangement, Pitt's time was not yet come: from this date however he ranged himself among the supporters of administration.

On Feb. 10, 1746, Lord Bath (Pulteney) was named first lord of the treasury and the head of a new administration, with his friend Granville for secretary of state; but it was found that this project could not be carried through; and four days afterwards Pelham and all his colleagues were again in the occupation of their several offices. On the 22nd Pitt was appointed one of the joint vice-treasurers for Ireland; and on May 6 was promoted to the office of paymaster-general. After each of these appointments he was re-elected for Old Sarum. To the next parliament however, which met in Nov. 1747, he was returned for Seaford, one of the Cinque Ports.

A few years previous, Pitt's pecuniary circumstances had been rendered much easier by a legacy of 10,000*l.*, left to him by the Duchess of Marlborough. He had thereupon resigned his post in the household of the Prince of Wales, and indeed had separated himself entirely from his royal highness, who still remained the recognised head of the opposition, such as it was, till his death in March, 1751. The discussions upon the Regency Bill, which in this session followed the death of the Prince of Wales, first occasioned an opposition between Pitt and Henry Fox (afterwards the first Lord Holland).

To the new parliament, which met in Nov. 1754, Pitt was returned for Aldborough in Yorkshire. On Nov. 15, 1755, Fox was appointed secretary of state, and, five days after, Pitt and his friend Grenville were dismissed. But after about another year Newcastle, already deserted by Fox, found it necessary to resign his position. In this crisis the king found it necessary to call in the popular favourite; and although the office of first lord of the treasury was given to the Duke of Devonshire, Pitt, appointed secretary of state, became the actual premier in Dec. 1756. He was now returned both for the town of Buckingham and for Oakhampton, and chose to sit for the latter. But in April, 1757, his Majesty abruptly sent Lord Temple his dismissal from the post he held of first lord of the admiralty, an act which was immediately followed, as must have been designed, by Mr. Pitt's resignation. For two months and a half the country remained without a government, during which time the court applied in vain to almost every section of party-men in the country, and the result was, that, before the end of June, Pitt was again premier, with the seals of secretary of state. Upon this new appointment Mr. Pitt was chosen member for Bath, for which he was also returned to the next parliament, which met in Nov. 1761.

The new reign however brought with it the ascendancy of Lord Bute and his friends; and a few weeks before the meeting of parliament, Mr. Pitt, on the refusal of his colleagues to acquiesce in his proposition of declaring war against Spain, resigned, along with his friend Earl Temple. On his retirement a pension of 3000*l.* a year for the lives of himself, his wife, and his eldest son, was conferred on Pitt, and his wife was made a peeress with the title of Baroness Chatham. These honours and rewards did not increase the popularity of the late premier.

Without *engaging* in any factious opposition, but on the contrary giving a general support to the government, Pitt now directed his eloquence against certain of their measures with all his old energy and fervour. Various attempts were made to induce him to enter the cabinet again, but he refused; and he declined even to take office with the Rockingham administration, although their measures generally had his support; but, as he said in the debate on the address in Jan. 1766, he could not give them his confidence, which, he said, was 'a plant of slow growth in an aged bosom; and youth was the season of credulity.'

Several overtures had in the mean time been made to Pitt, who in the end received a *carte blanche* to frame a new cabinet, which was completed about the beginning of Aug. 1766. It was a combination of all parties, resembling, as Burke said, a 'tesselated pavement without cement.' What most astonished the public in the whole arrangement was the manner in which Pitt disposed of himself: he took the almost sinecure place of lord privy seal, and, leaving the old scene of his glory, went to the Upper House as Viscount Pitt and Earl of Chatham.

This ricketty administration was in a state of confusion and embarrassment all the time it subsisted. Lord Chatham had been taken ill, and had withdrawn from all share in the conduct of affairs, and on Oct. 15, 1768, sent his friend Lord Camden to the king with a resignation of his office.

In 1770 Lord Chatham again appeared in his place, and occasionally took as prominent a part in debate as he had ever done in his best days. At last, April 7, 1778, after he had spoken once

on a motion for an address to the king on the state of the nation, he attempted to rise again to notice something that had been said by the Duke of Richmond in reply, when he dropped senseless into the arms of those beside him. He was carried home to his house at Hayes, in Kent. He never again rose from his bed, and died May 11, 1778, in the 70th year of his age.

All the enthusiasm which had been stirred by his name in former days was revived for the moment by his death; and to a funeral and a monument in Westminster Abbey at the public expense, were added a grant of 20,000*l.* for the payment of his debts, and a pension of 4000*l.* a year to his descendants.

The best Life of Lord Chatham has been written by the Rev. Mr. Thackeray, 'History of the Earl of Chatham,' 2 vols. 4to. Of his own writings nothing has been given to the world except a small volume of letters addressed to the son of his elder brother, afterwards Lord Camelford, which were published by the late Lord Grenville, and his 'Correspondence,' in 4 vols. 8vo. By his wife, who was the sister of George Grenville, he had two daughters and three sons.

PITT, THE RIGHT HONOURABLE WILLIAM, second son of the first Earl of Chatham, was born at Hayes, in Kent, May 28, 1759. His elementary education was conducted at home, under the Rev. Edward Wilson, afterwards canon of Windsor, and anxiously superintended by his father. He was sent in 1773 to Pembroke Hall, Cambridge, where, under Dr. Prettyman, afterwards Bishop of Winchester, he was soon distinguished for his talents and attainments. After leaving Cambridge Mr. Pitt visited France. On his return to England, he entered himself of Lincoln's Inn; and he was called to the bar in 1780. But after having gone the western circuit only once or twice, he was returned to parliament for the borough of Appleby, and from this date his original profession was given up for the House of Commons and a political career.

He took his seat Jan. 23, 1781, and his first appearance in debate was on Feb. 26, on the motion for the second reading of Mr. Burke's famous bill for the regulation of the civil list establishments. He gave his hearty support to the measure, 'and,' says the report, 'in a speech directly in answer to matter that had fallen out in the course of the debate, displayed great and astonishing powers of eloquence.' He afterwards spoke repeatedly on the side of the opposition in the course of this and the following session, before the termination of which it may be said that he had taken his place with Burke, Fox, and Sheridan (the last also a member of only the same standing with himself), in the front rank of the debaters of the day.

It was on May 7, 1782, that Mr. Pitt made his first motion for the reform of the representation of the people. The motion was defeated by an inconsiderable majority; but the mover continued for some years to advocate the opinions which he announced on this occasion. Under the Shelburne administration Mr. Pitt held office as chancellor of the exchequer. The alliance of Whigs and Tories however, which drove this ministry from office, was now opposed by another body of similar composition, formed by the Shelburne Whigs and the Tories who, seceding from Lord North, professed themselves the friends and supporters of the court. Of this opposition Pitt was the recognised leader in the House of Commons. Among other manœuvres to which he had recourse, with the view of annoying and damaging the government, was the renewal of his motion for parliamentary reform. The effect was to army Fox and Lord North against each other in the debate and division; but the motion nevertheless was negatived in rather a full house by a majority of nearly two to one. The serious opposition to the government did not begin till the next session, when Fox brought forward his India Bill; and when, in 1783, the king had procured its defeat in the Lords, and followed up his advantage by dismissing Mr. Fox and Lord North, Mr. Pitt was appointed prime minister, with the offices of first lord of the treasury and chancellor of the exchequer. At this time the government, though it had the voice of the people in its favour, had to contend against a strong opposition in the House of Commons. Mr. Pitt's policy during this remarkable contest was very masterly. Without at once dissolving the parliament, he suffered the opposition to damage themselves almost irretrievably in public opinion; and having succeeded in reducing their majority from about sixty to one or two, he dissolved the parliament, and sent them back to their constituencies, to be one-half of them rejected at the next general election.

Mr. Pitt's biography from this date is little else than the history of the public affairs of the kingdom so long as he lived. He continued at the head of the ministry for about 17 years—a most eventful and important period, in the course of which the relations of parties were altogether changed, and this country and Europe were suddenly and violently translated from a state of profound peace into the most general and most convulsive war that had been known in modern times. [BONAPARTE; GEORGE III.] The elder Pitt owes his chief fame as a minister to his conduct of the war in which he found the country involved on his first accession to power; but it is unfortunate for his son's political reputation that he should have been transformed from a peace into a war minister. The establishment of a new constitution for the East India Company (1784), the establishment of a new sinking fund (1786), the arrangement of a commercial treaty with France on very liberal principles (1786), the consolidation of the customs (1786), acts passed for the relief of the Roman Catholics in England, Scotland, and Ireland (1791, 1792), were the administrative innovations that chiefly distinguished this period, and which were understood to owe their origin mainly to the premier. In 1785 Mr. Pitt also again brought forward the subject of the amendment of the representation of the people in parliament; but he did not call in the aid of his authority as minister to ensure the success of his motion, which was negatived by a considerable majority, and which he never renewed. Afterwards, when the question

of reform was brought forward by Mr. Grey (afterwards Lord Grey), the proposal found in Mr. Pitt one of its most determined opponents.

Almost the only memorable legislative measure of the latter years of Mr. Pitt's first ministry was the union with Ireland, which was effected in 1799. The disappointment of the expectations which he considered himself entitled to entertain of the abolition, or at least very great mitigation, of the penal and disabling laws affecting the Roman Catholics, was the reason which he assigned to the king for retiring from office soon after the passing of this measure. He and his friends resigned in March, 1801.

For some time Mr. Pitt gave his support to the administration of Mr. Addington; but when the incompetency of the new cabinet became apparent he joined in the cry against it, and in May, 1804, he became again prime minister. He remained at the head of affairs till his death, Jan. 23, 1806. The overthrow of the new coalition which he had succeeded in forming against France, and the vexation arising from the impeachment of his friend, Lord Melville, are supposed to have been the causes of somewhat accelerating the period of his death.

PITTA, M. Vieillot's name for a genus of remarkable birds, placed by Mr. Swainson among the *Myiotherinæ*, or Ant Thrushes. [MERULIDÆ.]

Pitta, Vieill., Temm. M. Lesson remarks that, under the name of *Myiothera*, Illiger and Cuvier united the *Brèves* of Buffon and the Ant Thrushes properly so called. These Brèves are remarkable, he observes, for the vivid colours of their plumage, their long legs, and their very short tail. They are only found, he adds, in the Malayan Islands, whilst the Ant Thrushes belong to the New Continent as well as to the Old World.

'The genus *Myiothera*,' observes Mr. Swainson, 'is chiefly restricted to tropical America, and comprises numerous species of a smaller size, clothed in dark colours, but prettily variegated with white. Although distinctly separated from the Oriental group by their abruptly-hooked and strongly-toothed bill, they are yet so intimately allied to the small Bush-Shrikes (*Thamnophilinæ*) that it is almost impossible to draw a distinction between them.'

As an example of Pitta we select *Pitta gigas*, *Brève Geant*, or Giant Pitta. Locality, Sumatra.

Chlorisoma, Swainson. Example, *Chlorisoma thalassinum* (*Kitta thalassina*, *Pirolle Thalassin*, Temm.). Locality, Java, Sumatra, &c.

Grallaria, Vieill. Example, *Grallaria Rex* (*Roi des Fourmilliers*, Buff.; *King Thrush*, Lath.; *Turdus Rex*, Gmel.). Colour, brown, inclining to red, lighter beneath; occiput, plumbeous; forehead, varied with black and white. Locality, South America, Guiana, and Brazil especially.

PITTACAL, one of the ingredients of wood-tar, is an inodorous tasteless substance, not volatile, but decomposable at a high temperature.

PITTACUS, one of the so-called seven wise men of Greece, was born at Mityléne, in the island of Lesbos, about 652 B.C. With the assistance of the brothers of Alcæus, he delivered his native island from the tyranny of Melanchrus (B.C. 612), and when the Mityleneans were involved in a war with the Athenians about the possession of the town of Sigeum on the Hellespont, Pittacus gained the victory over the Athenian general Phrynon by a stratagem (B.C. 606). The popular party in Mitylene elected Pittacus to the office of æsymnétes to defend the constitution. His administration is said to have been marked by prudence, and to have been attended with success. In B.C. 580 he resigned his office, and spent the rest of his life in retirement. He died B.C. 570, at the age of 82. He was the author of many elegies, of which a few fragments are extant. Many of the maxims of practical wisdom current among the ancients were ascribed to Pittacus.

PITTENWEEN. [FIFESHIRE.]

PITTOSPORA'CEÆ are polypetalous exogenous plants. All the species contain in greater or less abundance a resinous substance, the use of which is unknown. Many of the species are pretty shrubs or bushes, sometimes extremely graceful, but they are of no known use. Most of them are natives of Australia.

PITTS, WILLIAM, was born in London, in 1790, and brought up by his father to the business of a chaser. It is likely that for what instruction in sculpture he ever had, he was chiefly indebted to Flaxman, by whom he was employed in chasing the shield of Achilles, designed and modelled by himself. Pitts was also employed on the Wellington shield, which was executed under the immediate inspection of Stothard, and upon a variety of works of his own, most of which were executed in bas-relief, and consisted of shields, vases, and such subjects as Samson slaying the Lion, Herod's Cruelty, the Rape of Proserpine, &c. The remuneration which Pitts obtained was far from proportionate to his ability and labour; and the embarrassments and disappointments to which he was subjected were probably the cause of his having put an end to his life by poison, April 16, 1840.

PITTSBURG. [PENNSYLVANIA.]

PITYRIA'SIS is a disease of the skin in which irregular patches of the cuticle appear covered with thin bran-like scales or with particles of a fine white powder, which, as fast as they fall off, are succeeded by others. The commonest form of this disease is that called *Pityriasis Capitis*, or Dandriff. It affects chiefly the scalp and eyebrows, and is most frequent in children, in whom it originates either from generally disordered health or from mere neglect of cleanliness. It occurs also on the face and sometimes on other parts of the body in adults and old persons after exposure to the sun or a cutting wind, and it usually accompanies the commencement of baldness. The only local treatment which is necessary or useful is frequent washing and the application of some mild and simple ointment.

PIUS I. [POPE.]

PIUS II. (*Æneas Sylvius Piccolomini*), born in 1405, at Corsignano in the state of Siena, succeeded Calixtus III. in 1458. He was a man of extensive learning, and had distinguished himself in the Council of Basel, 1431–39, in which he acted as secretary, and of which he wrote a his-

tory, 'Commentarius de Gestis Basil. Concilii.' At that time Piccolomini was a strong advocate for the supremacy of the Council, and when that assembly deposed Eugenius and elected Felix V., he was appointed secretary of the new pope or antipope, and was sent by him as his ambassador to the emperor Frederic III., who prevailed upon him to give up his precarious situation and accept the place of imperial secretary, sent him on several missions, and loaded him with favours. Piccolomini wrote several works in praise of his patron and in support of his imperial prerogative —'De Origine et Auctoritate Romani Imperii ad Fridericum III. Imperatorem, Liber Unus;' 'Historia Rerum Friderici III.;' 'De Itinere, Nuptiis, et Coronatione Friderici III. Commentariolus;' 'De his, qui Friderico III. imperante, in Germaniam, et per totam Europam memorabiliter gesta sunt, usque ad annum 1458, Commentarius.' At last Frederic sent Piccolomini as his ambassador to Pope Eugenius, with whom he managed so well by his dexterity, that the pope not only forgave him, but became his friend, and appointed him apostolic secretary. From that time Piccolomini became a stout advocate for the claims of the see of Rome. Meantime Eugenius died, 1447, and his successor, Nicholas V., was recognised by the Council of Basel, and Felix V. having abdicated in his favour, the schism of the Church was healed. Nicholas made Piccolomini bishop of Trieste, and afterwards of Siena, and sent him as nuncio to Germany and Bohemia, where he had several conferences with the Hussites, which he relates in his Epistles. He had however the merit of recommending mild and conciliatory measures as the most likely to reclaim dissenters to the bosom of the Church. He wrote a work on the history of Bohemia and the Hussites, whom he treated with considerable fairness and liberality.

Calixtus III., the successor of Nicholas V., made Piccolomini a cardinal, and in 1458, after the death of Calixtus, he was elected pope by the name of Pius II. His pontificate lasted only six years, but during this period he distinguished himself by promoting learning, by inculcating peace and concord among the Christian princes, and exhorting them to unite their efforts against the Turks.

Pius excommunicated Dietrich of Isemberg, who had been elected to the archiepiscopal see of Mainz for appealing to the general council against certain conditions which the pope had imposed on his confirmation. He also, by a bull addressed to the universities of Paris and Cologne, condemned his own writings in defence of the Council of Basel. He died Aug. 14, 1464.

As a learned man and a writer, Pius is best known under the name of Æneas Sylvius. Among his works are:—'Cosmographia, vel de Mundo Universo Historiarum,' liber i. (a second book treats especially of Europe and its contemporary history); 'In Antonii Panormitæ de Dictis et Factis Alphonsi Arragonum Regis, libros quatuor, Commentaria;' 'Epitome supra Decades Flavii Blondi Forliviensis, ab inclinatione Imperii usque ad tempora Johannis XXIII., Pont. Max.,' in 10 books; 'Historia Gothica,' published first at Leipzig in 1730; and numerous 'Epistles,' which contain much varied information. A collection of his works was published at Basel: 'Æneæ Sylvii Piccolomini Senensis Opera quæ extant,' fol., 1551; but this edition does not include all. Domenico de Rossetti has published a catalogue of all his works and their various editions: 'Serie di Edizioni delle Opere di Pio II., o da lui intitolate,' Trieste, 1830.

PIUS III. [POPE.]

PIUS IV., *Giovanni Angelo Medici*, or *Medichini*, of Milan, not of the great Florentine family of Medici, succeeded Paul IV. in 1560. At Easter, 1561, Pius re-assembled the Council of Trent, which had been prorogued under Paul III. He encouraged the persecution of the Waldenses, and of the Protestants in Calabria; and when, in France, Monluc, bishop of Valence, and the cardinal of Lorraine, recommended large concessions to be made to the Protestants with the hope of reconciling them to the church, he referred the matter to the council, who decided against any important reform. The council terminated its sittings in December 1563, and the pope confirmed its decrees by a bull. He died Dec. 1565. His disposition was generous, and he embellished Rome; but he was charged with the common fault of nepotism.

PIUS V., Cardinal *Michele Ghislieri*, a native of Alessandria in Piedmont, succeeded Pius IV. in 1566. He was austere in his morals, and wished to enforce a strict discipline among the clergy.

Pius V. enforced the authority of the Inquisition, of which tribunal he was a leading member, over all Italy. Numerous informers were kept in every town; and such was the terror produced by the severities which were exercised upon heretics, that the university of Pisa became almost deserted both by teachers and students. The pope also enforced the strict observance of the index of forbidden books. Besides asserting and enforcing in every case of dispute the ecclesiastical over the civil power, he reproduced the famous bull called 'In Cœna Domini,' which excommunicates all princes and others, who favour heresy, or attempt to circumscribe the ecclesiastical jurisdiction; and all those who appeal from the decision of the pope to the general council, as well as those who say that the pope is subject to the council. This bull however was set aside, after much altercation and considerable resistance, both in Italy and elsewhere.

By a bull dated Aug. 1569, Pius created Cosmo de' Medici, who till then had only the title of Duke of Florence, Grand-Duke of Tuscany, and his successors after him. Pius was a great promoter of the Christian league against the Ottomans. He died May 1572. He was austere and intolerant in his religious opinions, but sincere and disinterested, and of unspotted morals; he was learned, and a friend to learning, provided it did not encroach upon matters of belief. The Roman church has numbered Pius V. among its saints. He was succeeded by Gregory XIII.

PIUS VI., Cardinal *Angelo Braschi*, a native of Cesena, was elected pope in 1774, after the

death of Clement XIV. He was then 55 years of age.

In 1777 a question of jurisdiction caused a coldness between the courts of Rome and Tuscany. [LEOPOLD II.] A more important disagreement took place between the pope and Joseph II., emperor of Germany. Joseph was busy in suppressing superfluous convents, and emancipating the clergy of his dominions from the supremacy of Rome in matters of discipline. Ricci, bishop of Pistoia, who had also acted in conjunction with Leopold, assisted Joseph in these designs. Pius set out for Vienna in 1782, to visit the emperor, but was unsuccessful in his attempts to turn him from his purpose.

Next came the synod of Pistoia, which was assembled by the bishop Ricci in 1786, and passed several propositions that were considered highly censurable at Rome. Pius condemned these propositions by a bull, and suspended bishop Ricci from his functions; but Ricci, being supported by his sovereign, continued in his see.

Pius VI. was also busily employed in other matters besides controversy. He drained part of the Pontine Marshes. He restored the ancient Via Appia and the port of Terracina. He greatly enlarged the museum of the Vatican; made additions to the church of St. Peter's, and embellished Rome with new palaces, fountains, and other structures.

The internal administration of Pius was liberal and mild, but the storms of the French Revolution darkened the scene. In the first period of that Revolution, Pius VI. solemnly condemned the abrupt changes made in France concerning the discipline and the property of the clergy; but with regard to general or secular politics he showed even a bearing towards the popular side. A young man however, named Hugo Basseville, an agent of the French republican party, while making a foolish and ill-timed demonstration in favour of liberty, was stabbed by the Roman populace, and the papal government, though innocent of the fact, was charged by the French Convention as being a party to it. This completed the breach between France and the Pope; and the latter joined the league of the sovereigns against France.

When General Bonaparte invaded Northern Italy in 1796, he took possession of the legations, but offered terms of peace to the Pope, which he declined; but was eventually induced to yield, when Bonaparte granted more moderate conditions than might have been expected. In the following year, General Duphot, an attaché of the French embassy, with some companions, hoisted the tricoloured flag, and sallied into the streets, which led to a collision with the papal troops, and Duphot and some others were killed. The consequence was another invasion of Rome, under Berthier (Feb. 10, 1798), who took possession of the castle St. Angelo, and went himself to live in the Quirinal palace. Pius VI. remained in the Vatican. On Feb. 15, Berthier proclaimed the Roman republic, and afterwards sent an officer to intimate to the pope that he must renounce his temporal sovereignty. Pius refused, but being unable to oppose force, was obliged to leave the Vatican, Feb. 20. He was removed to Siena, to Florence, to Pignerol, and thence across the Alps during a deep snow to Briançon in France. He was afterwards transferred to Grenoble, and at length to Valence on the Rhône, where he died, in August 1799, in the 82nd year of his age.

PIUS VII. Cardinal *Gregorio Barnaba Chiaramonti* was born in 1742, of a noble family of Cesena. When the news of the death of Pius VI. came to Italy, 35 cardinals assembled at Venice, and after several months of deliberation, chose Cardinal Chiaramonti, March 14, 1800. In the following year the peace of Luneville, between France and Austria, was made, and Bonaparte ordered his troops to evacuate the Papal territories, with the exception of the legations, which had been formally incorporated with the so-called 'Italian Republic.' Meantime the ecclesiastical affairs of France were in a state of the greatest confusion; and Bonaparte wished for a concordat with Rome. The pope despatched to Paris Cardinal Consalvi, who smoothed down all difficulties, and a concordat was signed at Paris, July 15, 1801, and ratified by Pius at Rome, on Aug. 14, following. The principal scruples of the Pope were concerning certain articles called 'organic,' which Bonaparte appended to the concordat, as if they had formed part of it, and which were proclaimed as laws of the state.

From 1801 till 1804 Pius VII. enjoyed tranquillity at Rome, which he employed in restoring order to the finances, in ameliorating the judicial administration, in promoting the agriculture of the Campagna, and in other similar cares. In May, 1804, Napoleon was proclaimed emperor, and some time after he wrote to the pope requesting him to crown him at Paris; a request which Pius obeyed, after considerable hesitation. In May, 1805, he returned to Rome; and his troubles began soon after. Napoleon, under the pretence of protecting the Papal State from the English and the Russians, and in spite of the remonstrances of the Pope, beginning at Ancona, by degrees extended the French posts all along the Adriatic coast, and garrisoned the various ports. The refusal of the pope to annul the marriage of Bonaparte's brother with an American Protestant lady, and disputes as to the interpretation of the terms of the concordat led eventually to an open rupture. A French force under General Miollis entered Rome in February, 1808, took possession of the castle and the gates, leaving however the civil authorities undisturbed. The Pope was prevailed upon to send Cardinal De Bayanne as his legate to Paris, to make an effort at reconciliation, but the Cardinal had not arrived at his destination when a decree of Napoleon, dated April 2, 1808, united the provinces of Ancona, Macerata, Fermo, and Urbino to the kingdom of Italy. Napoleon followed this up by issuing a decree from Vienna, May 17, 1809, in which he united the remainder of the Roman states to the French Empire, leaving to the Pope his palaces and an income of two millions of francs (80,000*l.* sterling).

On June 10, 1809, the Pope issued a bull of excommunication against all the perpetrators and

abettors of the invasion of Rome and of the territories of the Holy See. The French commander, Miollis, being afraid of an insurrection of the people of Rome, thought it expedient to remove Pius from the capital. General Radet of the gendarmerie was entrusted with the abduction of the pope, who refusing to sign an abdication of his temporal authority, was taken first to Grenoble in Dauphiné, thence to Savona in the Riviera of Genoa, where he remained till June, 1812, and was then removed to Fontainbleau. The great question with Napoleon was how to fill up the vacant sees, as the pope refused the canonical institution, and also would not recognise his divorce from Josephine. In short, Napoleon found that unarmed priests were more difficult to conquer than the armies of one-half of Europe. After his return from the Russian campaign, Dec. 1812, Napoleon went to see the Pope, and treated him with studied attention; he also allowed several cardinals who were at Paris to repair to Fontainebleau, and at last he prevailed upon the pope to sign a new concordat, Jan. 25, 1813. But this concordat gave so much ecclesiastical power, both directly and indirectly, to Napoleon, that several of the cardinals, especially the Italian ones, stated that some of the articles were contrary to the canon law and the legitimate jurisdiction of the Roman see, and urged the necessity of a prompt retractation. Upon this Pius wrote to Napoleon, on March 24, retracting his concessions, but proposing a new basis for a concordat. Napoleon took no notice of the retraction, and soon after set off for his army in Germany, while the affair with the pope remained in suspense. On Jan. 22, 1814, an order came for the pope to leave Fontainebleau the following day. He set off accompanied by an escort, and was taken to Italy. He stayed at Cesena until the political horizon was cleared up. After the abdication of Napoleon and the peace of Paris, Pius made his entrance into Rome, May 24, 1814, in the midst of rejoicings and acclamations. By the articles of the Congress of Vienna the whole of the papal states were restored, including the legations.

The remaining years of the life of Pius were spent in comparative tranquillity, though not in idleness. By a 'motu proprio' of the year 1816, he confirmed the suppression of all feudal imposts, privileges, monopolies, and jurisdictions; he abolished every kind of torture; he diminished the land-tax; retained the register of hypothèques, or 'mortgages,' instituted by the French; laid down the basis of a new code of public administration, and in Nov. of the following year he published a new code of civil procedure, in which he regulated the costs of judicial proceedings. He maintained the commercial courts established by the French, as well as the new system of police. Unfortunately however the old system of secret proceedings in criminal matters was restored, as well as that of the ecclesiastical courts, which have jurisdiction also over laymen.

In July 8, 1823, Pius, who was then 81 years of age, had a fall in his apartments, and broke his thigh. He died, Aug. 20, amidst general lamentation. He was succeeded by Leo XII.

PIUS VIII. (Cardinal *Castiglioni*) was elected in March, 1829, to succeed Leo XII., and died at the end of the following year. He was succeeded by Gregory XVI. Nothing remarkable occurred during his short pontificate.

PIX, TRIAL OF THE. As a security for the integrity of the coinage, it was required that, before the master of the mint could receive his discharge, the coins should be submitted to a trial by jury. This final examination is technically called the Trial of the Pix, from the box in which the coins, which have been selected for that purpose, are contained. They are secured by three locks, the keys of which are respectively in the custody of the warden, master, and comptroller of the Mint.

PIZARRO, FRANCISCO, the discoverer and conqueror of Peru, was the natural son of Gonzalo Pizarro, an officer who had served in the Italian wars. He was born at Truxillo about 1480. His education was neglected, he never learned to read or write, and in early life he became a soldier, and went to America. The first occasion on which he gained distinction was during the expedition of Ojeda to Tierra Firma, by whom he was left as his lieutenant. He afterwards accompanied Nuñez de Balboa in his expedition to Mexico. Pizarro had seen fourteen years of arduous service, and was still one of the least wealthy of the Spanish colonists, when he joined Hernando de Luque and Diego de Almagro in the project of extending the Spanish conquests along the southern coast. Pizarro sailed from Panamà in November, 1524, with one small ship, 80 men, and 4 horses, to attempt the conquest of a great country; leaving Almagro to follow with reinforcements as soon as he could raise them. The expedition endured great hardships, but after the arrival of Almagro at Chicama they advanced to the south in 1526, and explored the coast of Quito. This country being too populous to attack, Almagro returned to Panamà for further aid, and Pizarro retired to a neighbouring island. In 1528 Pizarro himself returned to Panamà, whence he went to Spain, where he obtained for himself the appointment of governor over all the country to be discovered, with supreme authority, both civil and military, stipulating in return to equip a certain force, and remit one-fifth of all the treasure that he should acquire to the crown. He arrived at Panamà in 1530, and sailed in Feb. 1531, with 186 soldiers, leaving Almagro to follow with reinforcements. Pizarro first surprised the principal town of the province of Coaque, where he obtained a great booty, which enabled him to despatch two of his ships to Panamà and Nicaragua with remittances, which soon procured him recruits. Proceeding southward he took the island of Puno, in the bay of Guayaquil. At the mouth of the river Piura he founded the first Spanish settlement, and called it San Michael. Fortunately for Pizarro a civil war was at this period raging in Peru between the brothers Atahualpa and Huascar. Pizarro marched up the country to Caxamarca, and, by means of a dishonourable stratagem, he carried off Atahualpa a prisoner to

his quarters, where he was confined until he had advanced an enormous amount of treasure for his ransom, and then he was put to death in 1533. The government of Peru was now so far overthrown that no effectual opposition was offered to Pizarro, who marched upon and captured Cuzco.

In 1534 Pizarro's brother Ferdinand landed in Spain with the royal share of Atahualpa's ransom, when Francisco's authority was confirmed with new powers and privileges; and Almagro was appointed adelantado of a country to be conquered to the southward of Pizarro's government. Almagro marched to the conquest of Chile, while Pizarro busied himself with the internal government of Peru, in the arrangement and administration of which he showed considerable judgment. In Jan. 1535, he founded the city of Lima, to which he gave the name of Ciudad de los Reyes. In 1536 the Peruvians rose, and endeavoured to throw off the Spanish yoke: they cut off several detachments, and completely blockaded Pizarro in Lima, and his brother in Cuzco. This brought Almagro into Peru. [ALMAGRO.] After Almagro's execution in 1538 the young Almagro became the rallying point for all who were disaffected towards Pizarro. A conspiracy was formed against him, and on June 26, 1541, the conspirators, sixteen in number, headed by Herrada, entered the governor's palace at midday, when Pizarro received a thrust in the throat, and expired in the 62nd year of his age.

PIZZIGHETTONE. [CREMONA.]

PLACE, LA. [LAPLACE.]

PLACENTA, in Botany, is that part of a seed-vessel on which the ovules or seeds are placed. It is always of a *soft* cellular texture, and is commonly found occupying the margin of a carpel. It is however as often confined to a single point, as in nettles, and many other plants.

PLACENTA. [FŒTUS, vi. 260.]

PLACENTIA. [PIACENZA.]

PLAGAL. [AUTHENTIC.]

PLAGUE. [PESTILENCE.]

PLAIN-SONG. *Canto Fermo* (or *Plain-Song*) is the Italian name given by the Church of Rome to the ecclesiastical chant, which was probably borrowed partly from the music of the Greeks and partly from that used by the Jews in the synagogue. The Plain-Song is an extremely simple melody, if melody it may be called; it admits only one measure, the duple, and only notes of equal value. It is rarely allowed to extend beyond the compass of an octave, and never exceeds nine notes; and the staff on which the notes are placed consists of but four lines. The clefs are those of C and F.

PLAINS. All those parts of the dry land which cannot properly be called mountainous are plains, and such compose by far the greater part of the earth's surface. By the word *plain* a perfectly horizontal surface is not always understood. In its usual acceptation it means a greater or less extent of country, flat in its general level as compared with a mountainous country. The surface of the ground may be gently waving, as Salisbury Plain, and the Ukraine; or more prominently undulated, as the plain around Paris; or it may be studded with hills, as the plains of the Cassiquiare, without ceasing on such accounts to be a plain. Plains occur at every variety of heights above the sea-level, from the Delta of Egypt and the Llanos of South America, which are but a few feet above the sea, to the plain of Antisana, 13,435 feet above the same level. Though we generally regard those plains which are the least raised above the surface of the ocean as the lowest, it must not be forgotten that round the Caspian and Aral there are plains of many thousand square miles considerably below the sea-level; as is also the case with the plain or valley of the Jordan.

The term *Plateau* has often been applied exclusively to elevated plains, but this is incorrect, inasmuch as by a plateau is sometimes meant a great extent of country considerably raised above the rest of the land, and having its mountains, its plains, and its valleys, as the plateau of Albania, and the great plateau of Central Asia. A *Table-Land*, properly so called, is an elevated plain rising abruptly from the general level of the country, and being, as it were, the broad and horizontal or gently undulating top of an immense mountain, as the Nil-gherry district of Hindustan.

Generally speaking, the plains of Europe are of middling elevation, the extremes of high and low being principally found in Asia and America. Thus while the great plains of Central Asia, about Ladak, Tibet, and Katchi, and round Koukounoor and elsewhere, attain a height similar to those of Quito and Titicaca, or from 9000 to 12,000 feet, the great marshy plains of Siberia along the borders of the Frozen Ocean are very slightly raised above the sea-level, as is also the case with the plains of Bengal at the mouths of the Ganges, the whole of Mesopotamia, the Tehama of Arabia, &c. In South America, contrasting with the lofty plains of Quito, of Santa Fé de Bogota, &c., are the llanos and the plains of the Amazon; while, in North America, the vast prairies in the angle between the Missouri and the Mississippi and the low swamps round New Orleans form a striking contrast with the Rocky Mountains and the elevated plains of Mexico.

Plains differ not only in their elevation, but in their general slope, and in the nature of their soil; which circumstances, together with their geographical position, influence their climate and productions. The plains of America are generally characterised by their gramineous covering or their vast forests; the Asiatic plains by a twofold appearance, being in some parts studded with low saline plants, and in others, as in Southern Russia, Siberia, and Turkistan, covered with plants of the families of the Compositæ and Leguminosæ; while the greater part of the European plains, those of Hungary, Lombardy, and Lithuania for instance, which are respectively about 250, 500, and 600 feet above the sea, are highly cultivated.

There are some plains which are remarkable not only for their extent, but for the peculiarities which distinguish them. These remarkable plains are known under the names of deserts, steppes, savannas, prairies, llanos, pampas, and selvas. Deserts have been already described. [DESERTS.]

Steppes.—This name, which is Russian, is given more particularly to the extensive plains which lie on the north-west of Asia. Considered as a whole, the steppes have a character quite different from the other great plains of the world, though in different parts they present partially the distinguishing features which characterise the llanos, the savannas, the pampas, the sandy deserts, &c. Generally speaking, they consist of rich pastures intermingled with woods, barren sands, and saline clays, and abound in lakes, pools, and streams of salt and bitter waters.

Savannas and *Prairies* are names given to the great plains that lie chiefly on the western side of the Mississippi, though along the Illinois river they are found to the extent of 1,200,000 acres, and also in other parts of the basin east of the Mississippi. They are divided into three kinds:—1, the heathy or bushy, which have springs and are covered with small shrubs, grape-vines, &c., very common in Indiana, Illinois, and Missouri; 2, dry or rolling, generally destitute of water and almost of all vegetation but grass; they are the most common and extensive; 3, the alluvial or wet prairies, the smallest division; they are covered with a rich vegetation of tall rank grass; the soil is deep, black, friable, and fertile, and they abound in pools without issue, left by the floodings of the rainy season.

Llanos.—The whole interior of South America, from the mountains of Caracas on the north to the Straits of Magalhaens on the south is divided by comparatively low transverse ridges, running east and west into three great basins; that of the Orinoco on the north, that of the Amazon or Marañon in the centre, and that of the La Plata on the south. The first comprises the Llanos, vast plains occupying a surface of 260,000 square miles, the chief characteristic of which, says Humboldt, is the absolute want of hills and inequalities, the perfect level of every part of the soil. Often in the space of 270 square miles there is not an eminence of a foot high. This unvarying equality of surface reigns without interruption for 540 miles from E. to W., from the mouths of the Orinoco to the Villa de Aurore and Ospinos, and 600 miles from N. to S. between San Carlos and the Caqueta. There are however, notwithstanding this uniformity of surface, two kinds of inequalities in the llanos. The first, called *Brancos*, are horizontal banks of sandstone or limestone standing four or five feet higher than the rest of the plain, and sometimes many leagues in length. The second kind of inequality, called *Mesa*, consists of convex eminences rising to the height of a few fathoms. The aspect of the llanos is somewhat dissimilar in different places; but the greatest difference depends upon the seasons. In the rainy season, says Humboldt, the llanos display a beautiful verdure, but in the time of great drought they assume the aspect of a desert. The grass is then reduced to powder, the earth cracks, the alligators and great serpents remain buried in the dried mud till awakened from their long lethargy by the first showers of spring. These phenomena are observed on barren tracts of fifty or sixty leagues in length where the llanos are not traversed by rivers. The great wealth of the llanos consists in the numerous herds of horned cattle and horses which they feed. The first horned cattle were let loose in these extensive pastures by Christoval Rodriguez, about the year 1548, since which time they have increased to almost countless numbers.

Pampas, from an Indian word, which signifies a flat, is the name given to extensive plains in the southern and central parts of South America. The pampas of Buenos Ayres extend from the Andes to the Atlantic, and from the Rio Negro and Patagonia to the Rio de la Plata. They cover a surface of about 315,000 square miles. This plain slopes so gently towards the east, that the slightest inequalities, together with the absorbing nature of the soil and the great evaporation, are sufficient to arrest the course of the waters; so that, with very few exceptions, it has no running waters, but a great many shallow pools, of which the water is often brackish. The southern part of the plain is sandy, with patches of saline plants and stunted trees; the northern parts are covered with grass, supplying food to large herds of cattle and wild horses, the descendants of those first introduced by the Spaniards. This plain is traversed by the road from Buenos Ayres to Chile. The other pampas of South America present a similar general appearance to the pampas of Buenos Ayres.

Among the pampas, the traveller meets with tracts of great extent covered with sand and stones, between which some saline plants spring up here and there: these barren districts are called *travesias*.

Selvas is a name given to the wooded part of the great plain of the Marañon. This plain extends over a surface of 2,340,000 square miles, of which about 719,000 are covered with primeval forests, the rest of the space being occupied by waters, and by open patches of a character similar to the llanos and savannas, though little known. This region is one of the most extensive continuous plains in the world.

PLAN. This word (which is the same as Plane) means a representation of a plane section of any building, country, &c. Usually it is to the horizontal section that the term is applied, the words section or elevation being used to signify the vertical plans.

PLANE. [Straight Line and Plane.]

PLANE, INCLINED. [Inclined Plane.]

PLANE (*Platanus*). Botanists enumerate several species of this tree, of which two only deserve notice here, *Platanus orientalis* and *Platanus occidentalis*.

The *Oriental Plane* is a native of Asia Minor and the Levant, and, according to Royle, it stretches eastward as far as Cashmere. It appears to acquire a very great age, was extensively employed by both the Greeks and Romans for avenues and other purposes of ornament, and is to the present day the handsomest of all the hardy deciduous trees in cultivation. Its timber is fine-grained, hard, and well suited to such kinds of joiners' work as do not require strength; for which its brittleness renders it ill suited.

The *Occidental Plane* is also a tree of very large size and of considerable beauty, although inferior to the Oriental. This is the species found in Hyde Park, and in other public places near London, and is that usually planted in England, to the climate of which it is however ill suited. The wood is seldom well ripened, and is therefore liable to injury in winter, and it is continually damaged by our spring frosts; the consequence of which is that the trees grow slowly, and have always a shabby appearance, few of their leaves being free from brown and dead portions, unless in very favourable seasons.

Both species have the singular property of throwing off their old bark in hard plates of irregular size and form.

PLANET (ἀστὴρ πλανήτης, a wandering star). The term planet was first used as one of distinction between the stars which preserve their places, or seem to do so, and those which have a sensible motion, and, as is now known, move round the sun. The etymology would oblige us to include comets, many of the stars which have small motions of their own, or proper motions, as they are called, all those double stars which revolve about each other, and all the satellites which revolve about other planets. As discovery proceeds, it is likely that every body in the universe will be found to be planetary. The word however has changed its technical meaning, and is used to stand for a heavenly body which makes successive revolutions round our sun. It thus includes—the old planets, Mercury, Venus, Mars, Jupiter, Saturn (excluding the sun and the moon, the most easily-discovered planets of all, which are now planets only in poetry), the planet of Copernicus and Galileo, on which we live, the small planets [PLANETS, SMALL], Uranus, Neptune, three comets certainly, those of Halley, Encke, and Biela, and many others whose returns have not yet been verified.

By a Planetary Theory was once meant any hypothesis which serves to explain the motions of a planet, as actually perceived. Thus there was one theory of Mercury, another of Venus, &c. At present, by the theory of a planet is meant the deduction of its motion from the theory of gravitation.

PLANETARIUM. [ORRERY.]

PLANETS, SMALL. Our limits do not allow of our entering upon the astronomical history of these bodies, of which the number has very recently been more than doubled. This group of *asteroids* (as they are sometimes called) is a collection of very small planetary bodies, which revolve nearly at one distance from the sun, between Mars and Jupiter. They have the appearance of stars of from the seventh to the ninth magnitude; and the hypothesis that they are pieces of some broken planet is of reasonable probability. The discovery of Uranus, by William Herschel, in 1781, which first broke through the old opinion that the number of planets was complete, gave the impulse which ended in the discovery of the four *old* asteroids. But no more than four were known till our own immediate time.

The following table gives the names, discoverers, place and date of discovery, of all that have been announced up to November 1849:—

Ceres.	Piazzi.	Palermo.	Jan. 1, 1801.
Pallas.	Olbers.	Bremen.	Mar. 28, 1802.
Juno.	Harding.	Göttingen.	Sept. 1, 1804.
Vesta.	Olbers.	Bremen.	Mar. 29, 1807.
Astræa.	Hencke.	Driesen.	Dec. 8, 1845.
Hebe.	Hencke.	Driesen.	July 1, 1847.
Iris.	Hind.	London*.	Aug. 13, 1847.
Flora.	Hind.	London.	Oct. 18, 1847.
Metis.	Graham.	Sligo†.	April 25, 1848.
Hygeia.	De Gasparis.	Naples.	April 12, 1849.

PLANING MACHINERY. The first attempt to economize labour by means of planing machinery was made by General Bentham, who obtained a patent in 1791 for a contrivance by which large planes, wide enough to take the whole width of a plank at one stroke, and supplied with apparatus for directing their course, regulating the depth to which they could cut, and, generally speaking, for superseding the necessity of skill and judgment on the part of the operator, might be worked either by mechanical power or by manual labour. The improved principle, now generally adopted, was introduced in Bramah's patent of 1802. In a beautiful machine which he constructed for the Woolwich Arsenal the wood is placed upon a carriage and drawn by hydraulic power under the lowet surface of a rapidly-revolving disk or wheel, to the face of which a series of planes or cutting instruments are attached, which, acting upon the wood in quick succession, bring it to a very smooth and even surface.

Immense saving of labour, accompanied with a corresponding improvement in accuracy, has been effected by the application of planing machinery to the levelling of iron and other metals, in lieu of the cold chisel and the file, worked by hand. In some instances this has been done on the principle of Bramah's machine, above referred to; but more generally the planing of iron is effected by a stationary cutter, the iron being brought under it by a rectilinear motion. For this purpose it is not usual to employ wide cutting instruments, as for wood; but a narrow tool, cutting a mere line of the surface at once, is brought into contact with all parts of the surface to be levelled in succession.

PLANIPENNES, one of the sections of insects into which Latreille divides the order *Neuroptera*. The species of this section have the antennæ composed of numerous joints, always larger than the head; the mandibles are well developed, and the posterior wings are nearly equal in size to the superior; they are either naturally extended or have the anterior portion simply folded beneath: the reticulations of the wings are very distinct, and they are naked; the maxillary palpi are usually filiform, or slightly thickened at the apex, shorter than the head, and four-jointed.

This section is divided into four families, viz., *Panorpidæ*, *Myrmelionidæ*, *Hemerobiidæ*, and *Perlidæ*.

PLANISPHERE. This term originally stood for any representation of all or part of the sphere on a plane; it is now out of use, at least in that

* At Mr. Bishop's Observatory, South Villa.
† At Mr. Cooper's Observatory, Markree Castle.

sense. It has partially however been retained (and it is desirable that this meaning should become fixed and general) to signify any contrivance in which plane surfaces moving on one another fulfil any of the uses of a celestial globe.

The instrument which we proceed to describe is one which, at or near a given latitude, is, for ordinary uses, that is, for finding the position of the heavens at any one moment, much more easily used than the celestial globe, and very much less expensive. A circular disk of pasteboard, on which the stars visible in our latitude are laid down, turns on a second disk, round which are the days of the year on one circle, and the hours of the day on another. A third and hollow disk turns upon the same pivot, the hollow part being so cut that the portion of the heavens which it shows is precisely that which is visible at one time in the latitude of the instrument: the points of the compass are marked round the rim of the hollow disk, or of the horizon. The effect is, that by setting the disk which contains the stars to the day of the year, and the hollow disk to the hour of the day, the part of the heavens visible at that day and hour is distinctly shown. The time at which any star rises, culminates, and sets can be immediately found within a minute. We strongly recommend this instrument to those who study the face of the heavens, as being much superior to the globe.

PLANTAGENET. [Henry I. II.]

PLANTAGINA'CEÆ are a small natural order of plants belonging to the monopetalous exogenous series. They consist of herbaceous or suffrutescent plants, of which the common Ribgrass, or *Plantago lanceolata*, may be taken as the type. They are of no material importance to man. The mucilage surrounding the seeds of some is occasionally used in the stiffening of muslins by the manufacturers, and the *P. lanceolata* is sown on sandy bad lands, for sheep food.

PLANTA'GO, a genus of plants, the type of the natural order *Plantaginaceæ*. *P. Coronopus*, Buck's-Horn Plantain, is found in gravelly and sandy places, both near the sea and inland. It is a native of Great Britain. It has been eaten as a salad, but it is too bitter and astringent to be palatable, and these qualities have given it some reputation as an expectorant and vulnerary. *P. maritima* is found on the sea-coast and on high mountains in Great Britain. *P. lanceolata* was once cultivated as an agricultural plant, but was found to be unprofitable, and has long ceased to be sown. *P. media* is found in meadows and pastures in England. The leaves and root have been used in decoction as an astringent lotion. *P. major*, Great Plantain, is found in Great Britain, and has been called 'Way-bred,' from its prevalence on the way side. This plant has a peculiar tendency to grow in the neighbourhood of the abodes of men, and seems as though it followed the migrations of the human species. Thus, although not intentionally conveyed, it has accompanied our colonists to every part of the world, and is known in some of our settlements to the natives under the name of the Englishman's Foot. Small birds are almost universally fond of the seeds of these plants, which are covered with mucus.

PLANTAIN. [Plantago.]

PLANTANTHERA, referred to under *Butterfly Orchis*, is a misprint for Platanthera.

PLANTI'GRADA. [Carnivora.] The genera placed by Cuvier in this tribe are *Ursus* [Bear], *Procyon* (Racoons), *Ailurus*, the *Benturongs*, (*Ictides*, Valenc.), the *Coatis* (*Nasua*, Storr). (Here, he thinks, can hardly be placed the *Kinkajous*, or *Pottos*, Cuv. (*Cercoleptes*, Ill.), which join to plantigrade motion a long and prehensile tail, like that of the Sapajous, a short muzzle, a slender and extensible tongue, two pointed molar teeth in front, and three tubercular molars backwards.) *Meles*, Storr, *Gulo*, Storr, and the *Ratels* (*Viverra mellivora*, Sparm.; *Viv. Capensis*, Schreb.), which have one false molar less in each jaw than the *Grisons*, and their tubercular molar above but little developed, so that they approach the Cats in their teeth, whilst their external form is that of the Grison and the Badger; the legs being low, and the feet plantigrade, with five toes on each foot, armed with very strong claws, &c. (*Règne Animal.*)

PLANTIN, CHRISTOPHE, was born in 1514, in the French province of Touraine, of poor parents. He learned the art of printing at Caen, in Normandy, and after working as a printer at Lyon and at Paris, the religious disturbances, which commenced about that time, induced him to remove to Flanders, and he is known to have been a master printer at Antwerp in 1555. The beauty as well as the correctness of the works which issued from his presses, extended his reputation rapidly, and he acquired a considerable fortune. He died July 1, 1589. Besides his printing-establishment at Antwerp, he had one at Paris and another at Leyden. The work which has given most celebrity to Plantin's printing establishment at Antwerp is the edition which he printed of the Great Polyglott Bible, which had previously been printed at Alcala, in Spain, under the direction of Cardinal Ximenes. [Cisneros.]

PLANTING and PLANTATIONS. Planting is the operation of placing in the soil the roots of a plant which has been previously removed; and the preservation of the roots is the first thing to be attended to. It should be kept in mind that the *spongioles*, or delicate extremities of the fibres, are the parts by which the chief supply of food from the earth is absorbed by the plant. Their tissue being tender and almost naked, they are very susceptible of injuries from mechanical action; and being adapted for performing their functions in a humid medium, they readily suffer from being kept for any length of time exposed to free air and drought. In taking up the plants therefore, the roots should be loosened in such a manner as to receive the least possible violence in the operation. If the tree be large, a trench should be opened beyond the extremities of the roots, of sufficient width and depth to allow the process of undermining to be freely carried on. The roots should be gradually set at liberty by a round-pronged fork, the prongs tapering so as to be easily inserted, yet

not by any means so sharp as to prick the roots. As the fork is being used, the soil from among the roots will fall into the open trench, but as it accumulates there it must be cleared away, and at the same time the portion of roots set at liberty will require to be slightly tied together with pieces of matting, and if necessary supported by temporary stakes, or held to one side by an assistant, whilst the planter proceeds in liberating others. If there be, as is frequently the case, a tap-root extending to a much greater depth than the other roots, and if the latter have been carefully preserved during the operation, the tap-root may be cut off, for it could only be raised in a mutilated state, owing to the great solidity of the earth at such a depth. Although it is very desirable to preserve the greatest possible quantity of sound roots, yet all that are bruised or lacerated should be cleanly amputated up to the sound parts.

In the early stage of rearing trees, while the proportion of roots predominates, it may be found advisable in various cases to shorten not only the tap-root, but also judiciously some of the other strong roots, in order that subdivisions of a more fibrous nature may be produced, and a number of rootlets substituted for large root-branches. The roots, by this kind of management, and, by being kept from exposure to drying winds, frost, and wet, will suffer little from the operation of removal; but if the operation be not performed at the proper season, success will not be complete. Though December, January, and February are sufficiently moist, yet November, or as soon as the leaves have fallen, is the preferable season for planting. There may be some exceptions, as in the case of very wet soils, where the plants, if not firmly rooted, are liable to be thrown out during winter, owing to which spring planting would be more proper. But under ordinary circumstances all deciduous trees will succeed best if planted at this period. Such species as push forth their buds early ought certainly to be planted in autumn. Many of the Coniferous tribe will succeed well if planted soon after they have made their summer's growth: the earth is then warm, and the plants make roots very promptly.

The watering of newly-planted trees ought to be attended to. The supply in the first instance should be copious, in order to wash the earth into the cavities among the roots; but afterwards no more water should be artificially applied than is necessary to moisten the roots as much as the soil in which the species grows naturally, and at a time when shoots and leaves are abundantly produced. In the case of plants being much dried from long carriage or other causes, the supply on first planting should be very moderate. The tops however should be frequently syringed, in order to moisten the bark and allow the sap to descend towards the root.

The manner of performing the operation of planting may be reduced to one general principle, that of placing the roots in the soil so as to imitate as closely as possible the position which they occupy when growing naturally.

The excavation for the reception of the roots of a plant should be considerably larger than those roots will traverse when extended at the time of planting. It should be as wide at bottom as at top. The bottom should be more or less convex, and the depth such as to admit of the roots being covered to the extent observed in undisturbed seedling plants of the same species; that is to say, the upper part of the root should only be just covered. The lower roots should be regularly disposed over the convex bottom of the excavation, and carefully strewed with some of the finer portion of soil, over which the other roots may be spread. More soil should then be carefully rather than forcibly introduced. A plentiful watering should be given when the soil is nearly all filled in; and after the water has subsided, so as not to stand above the surface, the latter should be covered with the rest of the soil.

Plantations are generally planted thick in the first instance, and with various species of trees. Larch, Scotch fir or pine, mountain ash, &c., are interspersed amongst the hard wood for shelter, or as nurses. Laburnum is also useful for preserving the other sorts from the depredations of hares, as they prefer the laburnum to every other bark. The nurse-trees are generally left till they are fit for various purposes for which small timber is applicable. They should be planted closer to each other than to the principal trees intended to constitute the more permanent part of the plantation.

After all the care of the planter and the skill with which the operation of removal may have been effected, much of the success of a plantation depends on the proper adaptation of species to the soils and situations most suitable to them.

The following remarks upon some of the timber trees principally cultivated may be useful.

The oak, *Quercus robur*, and *Q. sessiliflora*, prefers strong or even clayey loam; any soil not wet or chalky.

Beech, *Fagus sylvatica*, calcareous soils, gravelly or sandy loam; dislikes stiff clay.

Elm, *Ulmus campestris*, *U. glabra*, *U. montana*, attains, near the banks of rivers, a large size; thrives in most soils.

Ash, *Fraxinus excelsior*, prefers a dry subsoil; dislikes stiff clay.

Plane, *Platanus orientalis*, rich warm soil, tolerably moist, but not retentive.

Sycamore, *Acer pseudo-Platanus*, *A. platanoides*, best in moist deep soil, but will thrive in others not too stiff; withstands the sea-breeze.

Chestnut, *Castanea vesca*, deep sandy loam.

Walnut, *Juglans regia*, deep loam, with a pervious subsoil; dislikes strong clays.

Birch, *Betula alba*, forms best timber on dry sandy or gravelly soil.

Lime, *Tilia Europæa*, soft deep loam, in low rather moist situations.

Horse-Chestnut, *Æsculus Hippocastanum*, deep loam, not in exposed situations.

Poplar, *Populus alba*, *P. canescens*, *P. nigra*, *P. tremula*, *P. fastigiata*, *P. Græca*, *P. monilifera*. These thrive in almost any soil, but best in that which is deep and rather moist.

Mountain-Ash, *Pyrus aucuparia*, any soil, wet clay excepted; adapted for high situations.

Alder, *Alnus glutinosa*, moist or even swampy soil.

Willow, *Salix*, of numerous species. Some thrive in rather dry soil, but all prefer moist.

Pine, *Pinus sylvestris, P. Laricio, P. pinaster, P. strobus.* The first two are adapted for thin, rocky, gravelly soils; they grow at a great elevation on the warmest sides of mountains, but better in mountain glens; they dislike stiff clay and deep strong loam, and, like all coniferous plants, they do not thrive on chalk. *P. pinaster* and *P. strobus* require a less exposed situation than the other two.

Spruce, *Abies excelsa, A. alba, A. rubra, A. nigra*, deep moist soil, in low situations; dislikes thin sandy soil and exposure.

Larch, *Abies Larix*, adapted for thin mountain land, or any soil of which the subsoil is not retentive, excepting however red-sandstone or chalk.

Too close planting produces weak drawn-up timber, in consequence of the tops only receiving a due share of light. If, on the contrary, trees are planted at too great a distance from each other, they are inclined to ramify into large limbs and spreading tops, with a stem short but much thicker than where the space admits of less expansion of foliage. If therefore very thick timber of no great length be required, wide planting is proper; but if tall timber be the object, the plantation must be moderately thick.

The care which plantations require from year to year consists in making up deficiencies, thinning, and pruning. Deficiencies seldom occur if the planting be at first duly performed. Thinning should be commenced in due time. No branch of the temporary trees should by any means overhang the top or even branches of those that are permanent. The shelter on the most exposed sides of the plantation should be formed of robust, vigorous, growing kinds, and it should be allowed to remain unbroken. Plantations that have been neglected till they have formed a dense thicket must be thinned gradually; for if thinned at once, those left would be injured by the sudden exposure, and would be blown over by winds.

Pruning is an important operation in the management of plantations, but it is often improperly practised for want of the knowledge of a few physiological facts, which are essentially necessary to be stated before any rules for pruning can be properly given. It ought to be understood, that the sap ascends from the stem chiefly through the alburnum, or outer layers of young wood. It then enters the leaves, where it is exposed to the influence of light. Having in consequence undergone an elaboration, it descends on the outside of the alburnum, that is to say through the inner bark, the internal surface of the latter possessing a great degree of lubricity, whereby the passage of a portion of the juices at least is facilitated to the roots, whilst part is detained and becomes organised by the action of the medullary rays, forming a new layer of woody matter. The thickness of the layer so formed is very different in different species; but in the same species, all other circumstances being the same, it is in proportion to the surface of leaves. The aggregate

horizontal growth, or in other words the diametrical extension of the stem, branch, and even roots, depends upon the quantity of healthy foliage; and it may be remarked, that in general if a tree be left entirely to nature, it will ultimately produce a greater bulk of wood, taking stems and branches together, than would be the case if subjected to pruning. Except however in the case of growing for fuel, pruning is more or less necessary. The value of a timber-tree depends chiefly on the stem, the branch-timber being of less value. The object to be kept in view in pruning for timber is the production of a clean stem with as small a proportion of branches as possible. But it has been explained that the growth of the stem depends on the quantity of foliage, and without branches a sufficient quantity of foliage cannot be maintained. A large privation of foliage should never be occasioned at any one time. It is therefore advisable that pruning should be commenced early, in order, as it were, to repress irregularities in the bud. Thus, when a shoot, occupying the position of a branch, ascends in competition with the top, or leading shoot, and is allowed to go on for years, the stem will have a forked character; or if the competing portion be amputated after it has acquired a large size, the timber will be rendered unsound. But if the shoot from which this aspiring limb took its rise had been stopped in the first or second season of its growth in summer, the tree might have been grown with a clean regularly-tapering stem. It is only great irregularities however that should be meddled with during the early growth of the plant; otherwise the increase of roots is prevented, such increase being reciprocal with that of the branches.

Supposing it were required to rear a tree so as to have a stem of clean-grown timber, as tall and as thick as could possibly be obtained in any given time. The first consideration is the root, the plant being supposed to be young, with a top or upright leading shoot, and several side branches. All these should be left undisturbed in the first instance, unless such of the latter as may require a check if growing too strong for the others or for the leader. The laterals should be left, for the sake of the roots, till their presence on the stem becomes inconsistent with the object of producing it as free as possible from knots, taking also into consideration that the difficulty in healing the wound increases as the branches get older. A few of the largest shoots should be those first removed. They may be shortened in the first instance after midsummer, and afterwards cut off smoothly by the lowest circular wrinkles which form round their base, close to the stem, but without slicing off a portion of the bark; a slovenly practice, of which only bad pruners are guilty, and which can only have the effect of diminishing the power of the bark to close over the wound necessarily made by the pruning-knife. In the following season the next largest branches should be in like manner displaced, care being still taken, on account of the importance of the foliage, that the quantity removed shall be no more than is absolutely necessary. Small branches along the stem should be left till they approach

the dimensions by which the removal of the others is regulated.

Coniferous trees require little pruning; nor is it necessary to commence so early with them as in the case of other kinds. In dense forests they are found with straight stems approaching the height of 100 feet clear of side branches, the latter gradually decaying below as they become excluded from light and moisture by those above them.

The proper season for felling trees is when the sap is most at rest. The operation ought not to be performed at any other time, unless for firewood. With respect to oaks, the practice of barking in the spring and felling in the succeeding autumn is by no means unobjectionable, and on some accounts is decidedly inferior to felling in autumn or very early in winter without previous disbarking.

PLANTS, FOSSIL. The progress of knowledge concerning the vegetation which in ancient geological periods covered the surface of our planet has been recently much increased.

Previous to the year 1828 there can hardly be said to have been specifically known so many as one hundred fossil plants. In the Prodrome of M. Brongniart appeared (p. 219) 501 fossil plants, while the recent tribes were estimated at 50,350. In 1845 Mr. Göppert estimated the known fossil plants at 1792, and the recent species at 80,000. ('Reports of the British Association.') Following the classification of M. Brongniart, we find his 501 plants thus divided and compared with living tribes:—

	Fossil.	Recent.
Agamia	27	7,000
Cryptogamia cellulosa	2	1,500
Cryptogamia vasculosa	256	1,700
Phanerogamia gymnospermia . .	67	150
Phanerogamia monocotyledonea .	49	8,000
Phanerogamia dicotyledonea . .	100	32,000

It thus appears that the vascular Cryptogamia numerically constituted above half the fossil flora known in 1828, while among living plants they count only as 1 in 30; and the dicotyledonous group, which includes more than half the recent plants, is represented in the stratification of the globe by one-fifth. These results, though modified by later discoveries, are still firmly established.

An important question affecting the general inferences to be derived from the study of fossil plants is whether those plants grew in or near to the situations where they now remain buried? The answer must be affirmative in some cases, doubtful in many, and negative in the remainder. It must be affirmative in respect of many cases of Stigmaria, which are now universally regarded as the roots of trees analogous to Stigmaria and Lepidodendron. It must be affirmative in respect of the Cycads of the Isle of Purbeck, which remain yet rooted as in their period of life, with the bed of soil in which they grew.

In the case of the great proportion of fern-leaves, and scattered branches and fragments of stems of Lepidodendra, which abound in the roofs of many coal-beds, we cannot doubt that these

have been subject to drifting, though it is not easy to determine from what distance or in what direction. As however the leaves retain almost universally their figure, expansion, and veins, and are represented by so much of a carbonaceous pellicle as may correspond to their whole mass, and have sometimes preserved their fructification, we need not suppose them to have been drifted from far, nor to have been long immersed in water.

Many other cases of fossil plants occur, which require us to admit at least the possibility of their having been drifted from great distances. The large broken stem of coniferous wood found in the sandstone of Craigleith, and described by Mr. Witham, may be taken as an example. It suggests, concerning many other cases of coniferous fossil wood found in the lias, oolites, Wealden Clay and London Clay, the idea of a great muddy river flowing through a woody region, and depositing in marshy plains, in æstuaries, or in the bed of the open sea, the materials collected in its course. In this latter case we frequently observe the wood to be perforated by Teredines, in the London Clay.

From these observations we may conclude that the large accumulations of fossil plants which belong to certain stratified deposits, represent approximately, though not completely nor exactly, the flora of the period of their deposition at and near the places where they are found; but that single plants or scattered small collections of them may have been derived from remote situations.

Can we, from the catalogues of fossil plants, determine what was the climate in which they flourished during primæval periods? Confining our attention to the British Isles, we remark three great accumulations of fossil plants, in three successive periods. The land vegetation of Palæozoic periods is well represented by the plants of our coal-measures; that of the Mesozoic periods by the plants of the oolitic shales of the Yorkshire coast; and that of Cainozoic ages is known to us in some particulars by the deposits of Sheppey, rich in seed-vessels.

The most numerous group of fossil plants, in the two former great periods, is certainly the tribe of Ferns, which, with the other vascular Cryptogamia, are known to be most numerous, in comparison of the other races of plants, in countries where the climate is warm and the atmosphere damp. Some of these are Tree-Ferns, which remarkably characterise warm though not necessarily very hot climates. With these are associated in great abundance large stems, like Cacteaceæ; others like gigantic Equisetaceæ; others like monstrous hybrids of Lycopodinceæ and Coniferæ, and a few Palms; all confirming, by their structural analogies, the conclusion that the climate of the carboniferous period in the northern zones of Great Britain was warm. Warmth of climate appears also to be indicated by the seed-vessels of Piperaceæ, &c., which occur in the London Clay. A higher temperature being inferred from the nature of the fossil vegetation, the question occurs as to the source whence these plants derived their supply of the substances which yield the elements of which they consist.

This has been accounted for on the supposition that a larger quantity of carbonic acid existed in the atmosphere of the coal-beds than at the present period. We shall come to this conclusion if we calculate the quantity of carbonic acid gas proportioned to the carbon in a given weight of coal: that quantity of the gas, at least, existed in the atmosphere before the fixation of the carbon in the plants which yielded that coal. The whole quantity of coal actually buried in the earth is of course not known, but that which is known, submitted to this calculation, is enough to leave no doubt that previous to the carboniferous period the atmosphere must have been loaded with carbonic acid gas, unless compensating processes, of which we have now no example, were contemporaneously in action. The compensating process now in action is chiefly animal respiration; but we have little or no evidence of the existence of air-breathing terrestrial animals previous to the carboniferous æra.

PLANU'DES, MAXIMUS, a Byzantine monk, a native of Nicomedía. In the year 1327 he was sent on an embassy to Venice by the emperor Andronícus the elder. He was still alive in 1340; but the year of his death is uncertain. Planudes made a collection of Greek epigrams in seven books, extracted from the copious Anthology of Constantinus Céphalas. It was first printed at Florence, in 1494, by J. Lascaris. Planudes also made a collection of fables, ascribed to Æsop, to which is prefixed a life of Æsop, which is full of absurdities. The other works attributed to him are not worth mentioning here.

PLASENCIA. [Estremadura, *Spanish.*]

PLASTER OF PARIS. [Calcium.]

PLASTERING is the art of applying plastic adhesive compositions or cements to walls, ceilings, and such other parts of a building as may require a smooth and even surface. The business of the plasterer also embraces the formation and fixing of ornamental cornices, centre-pieces, and other similar ornaments.

In the application of plaster or stucco to a brick wall, the first thing to be observed is to secure a rough and porous surface to which the composition may adhere readily. In applying the plaster, the surface must first be brushed free from dust, then wetted with water, and covered with a first coat of fluid stucco, applied with a coarse bristle-brush, after which, before it is quite dry, the first coat of coarse mortar-like composition is applied. In plastering upon quarter-partitions or upon the under surface of timber floors to form ceilings, a very different process is adopted. In both of these cases a surface is formed to receive the first coat of plaster by nailing to the timber quarterings, or to the joists in the case of a floor, narrow slips of wood called *laths*. This done, the first coat of plaster, consisting of what is called *coarse stuff*, which is a mortar of lime and sand mixed with ox or horse hair, to give it consistency, is applied with a peculiar kind of trowel, in such a way as to force the mortar through the narrow openings between the laths, behind which, in consequence of its soft and wet state, it swells in such a way that, as it sets or hardens, it becomes firmly *keyed* to the laths, so that it could only be broken away in little bits, and by the application of considerable violence. This groundwork serves to receive any kind of plastering that may afterwards be applied.

Mouldings and cornices are formed upon a core or foundation, either of brackets and laths, or in some cases in external work, of projecting bricks and tiles. Very trifling projections may sometimes be supported sufficiently by a few projecting nails. If large, a layer of comparatively coarse stuff is applied to the foundation, and to this, when dry, is applied the finer composition of which the moulding is to be formed, as nearly as possible in the required shape.

PLASTIC CLAY. The lower part of the Tertiary series of England and France yields, with green-sands and pebbles, beds of red, white, or mottled clay, often of excellent quality for the potter. The series of beds related to these clays and sands has received the name of Plastic Clay Formation, but, by a large view of its geological and zoological characters, it may be ranked in the same group as the London Clay, and thus be contained in the Eocene Deposits of Lyell.

PLATA, RIO DE LA, is a large river, or rather æstuary, in South America. Where this æstuary enters the sea, between Punta del Este and Cape San Antonio, its width is not less than 120 miles; and between Punta de las Pedras and the Barrancas de Santa Lucia above Monte Video, it is still 53 miles wide; but above these places the shores gradually approach nearer, and opposite Colonia they are hardly 20 miles apart. The æstuary continues to preserve this width to the confluence of the Paraná and Uruguay, the two large rivers which fall into it. This æstuary at its mouth is only ten fathoms deep on an average, and this depth gradually decreases. Every part of it is shallow, and difficult to navigate, especially during the prevalence of the south-western gales, which blow with inconceivable fury.

Through this æstuary the commercial produce of about one-fourth of South America is brought to the market of the world. It is therefore a great advantage to the countries from which the æstuary of the Plata receives its waters, that the rivers which flow into it offer less obstruction to navigation than is usual in large streams. These rivers are many of them large; the chief are the Paraná, Uruguay, Paraguay, Pilcomayo, Vermejo, Lavayen, Tarija, and Salado.

PLATA, LA. *The Provinces of the Río de la Plata*, also called the *Argentine Republic* (*República Argentina*), comprehend a large part of the surface of South America. It is bounded on the N. by Bolivia; on the W. by Chile and Bolivia; on the E. by Brazil, Paraguay, and Banda Oriental; and on the S. by Patagonia. It lies between 22° and 41° S. lat., and 54° and 70° W. long. The length is 1320 miles; the average width is 620 miles. The area is about 726,000 square miles.

Surface and Soil.—About one-sixth of the surface of this country is mountainous: the remainder consists of wide plains, on which are scattered a

few isolated ranges of hills, and an extensive system of low mountains, called the Sierra de Cordova. The mountainous countries lie on and along the eastern declivity of the Andes. This mountain-range, from 40° S. lat., where it begins to constitute the western boundary of the Argentine Republic, dividing it from Chile, to 37° S. lat., is very little known. Farther north, between 37° and 34° S. lat., it is known that the Andes consist of two parallel ranges, which in some places approach one another within 30 or 40 miles, and at others are 70 or 80 miles apart. These ranges contain many lofty summits far above the snow-line, and several volcanos. Between 34° and 33° S. lat., the two ranges of the Andes are not far distant from each other, and they inclose the elevated valley of Tunuyan, which is about 20 miles wide, and 7500 feet above the sea-level. Between 33° and 30° S. lat., the two ranges recede from one another to the distance of 40 or 50 miles. Between these ranges is the valley of Uspallata, which is about 180 miles long and 40 miles wide, of which width about 15 miles are level ground, and the remainder consists of hills which skirt both ranges. North of 30° S. lat. the Andes assume a different character; they are separated in some parts into three parallel ranges, which inclose elevated valleys between them, in some instances very fertile. North of 28° S. lat., the Andes cover an immense extent of country east of the high range which runs parallel to the Pacific. The northern part of the mountain-region is without the countries that belong to the Argentine Republic, and included in Bolivia, where the snow-capped Alturas de Lipez form its northern border. The rivers which have their origin among these mountains furnish the greater part of the supply for the Rio de la Plata. The valleys are numerous, and many of them are very fertile.

The *Plains* occupy about five-sixths of the surface of the provinces of La Plata. The most northern part of them, which is known under the name of El Gran Chaco, extends on the east of the mountain-region as far as the banks of the Rio Paraguay, and from the northern boundary of the republic to the confluence of the Rio Salado with the Paraná, occupying all the tract between these rivers. This immense country, which covers 120,000 square miles, is very little known, there being only a few families, and those mostly of Indian origin, settled on the banks of the rivers. The southern portion of the Gran Chaco, between 26° and 30° S. lat., is a complete desert for want of rain and water. The general character of the soil is sandy. West of the Rio Dulce and between 28° 30' and 30° S. lat., a desert extends as far west as the neighbourhood of the Sierra Velasco, from which it is separated by a fertile tract, called La *Costa*, hardly 20 miles wide. The desert is for the most part covered with a thick salt efflorescence, and is intensely hot. That part of the plain which lies between 30° and 33° S. lat. has a different character. Nearly in the middle of it is the Sierra de Cordova, a system of heights, which in another place would be called mountains, but in the neighbourhood of the snow-capped Andes can only be called hills; the valleys between these heights exhibit many fertile spots. The country which extends from the Sierra de Cordova to the Rio Paraná is hilly, or strongly undulating along the base of the heights, and produces good crops of Indian corn in the lower tracts where the fields can be irrigated. There are in this region many salt lakes, into which numerous rivers flow, without having any outlet to the ocean. The country which lies on the west of the Sierra de Cordova, and extends in that direction for 120 or 130 miles from the range, is nearly altogether bare of grass.

That part of the plain which extends from 33° S. lat. to the banks of the Rio Negro, the southern boundary of the Argentine Republic, is known under the name of *Pampas*. Though generally considered as one plain, extending on a perfect level from the shores of the Atlantic to the base of the Andes, it has been observed that nature has divided it by some tracts of more elevated ground into several regions, which differ in soil and fertility. The most remarkable and best known of these elevated grounds begins on the shores of the Atlantic between Cape Corrientes and Punta Andres, south of 38° S. lat., with rocks, which at some distance from the sea rise to the height of hills, having broad summits in the form of a table-land, and steep sides. Another and more elevated range lies behind this, and forms a water-shed between the eastern and western Pampas. The Rio Salado divides the *Eastern Pampas* into two nearly equal parts. Though numerous settlements have been made in the country north of the Rio Salado, by far the greatest part of it is still in its natural state. It is a continuous level plain, covered with coarse luxuriant grass, growing in tufts and partially mixed with wild oats and trefoil. All its rivers are *impregnated with salt*; but good well water is procured at a short depth beneath the surface. The country south of the Rio Salado is of a somewhat different character. Near the banks of the river it is on a level with the country north of it, which it resembles in every respect; but about 10 miles from the river swamps begin, which extend over a great part of this region. The portion of the eastern Pampas lying between the Sierra del Vulcan and the Sierra Ventana and the ridges dependent on them, resembles in its natural features the country south of the Rio Salado. The greatest part of the *Western Pampas*, namely, all the country west of 62° W. long., and extending thence to the Andes between 34° S. lat. and the Rio Negro, is almost unknown, having only been explored along the courses of the rivers, except in one line, in which it has been traversed by land.

The Argentine Republic contains also an extensive tract of hilly country, which lies between the rivers Paraná and Uruguay. In the northern part of this region is the Laguna de Ybera, which extends from N. to S. in some places nearly 100 miles, and from E. to W. about 80 miles. It covers an area of more than 3000 square miles. A narrow strip of elevated ground divides its northern border from the Rio Paraná, and it is

supposed that it is supplied with water from that river by infiltration, as no stream enters it. That portion of this country which extends from the lake of Ybera in a north-eastern direction to the boundary-line of Brazil, is known under the name of the *Missiones*, from the circumstance of the Jesuits having collected here a great number of aborigines, and accustomed them to a civilised life.

Rivers.—All the rivers which drain the Argentine Republic, as far as it is situated north of 34° S. lat., carry their waters to the wide æstuary called La Plata. [PLATA, RIO DE LA.] Before they reach this fresh-water sea, they form two large rivers, the Paraná and the Uruguay. The Paraná originates hardly 20 miles from the shores of the Atlantic, on the table-land of Brazil; and, after leaving that empire, flows 900 miles through the Argentine Republic. In one part of its course it incloses a large island called Apipé. Below the junction with the Paraguay, the width of the river varies from 1¼ mile to 2 miles, but the whole volume of water seldom flows in one channel, as the current is divided by a continuous series of islands overgrown with low trees and subject to inundations. It opens into the La Plata with a large number of embouchures, forming a long but comparatively narrow delta, composed of a great number of islands.

The Paraguay, the largest of the affluents of the Paraná, originates likewise in Brazil. Having entered the Republic, it flows through it for about 400 miles, till it joins the Paraná. The Paraguay receives an immense amount of water from the Andes by numerous tributary rivers, of which the Pilcomayo and the Vermejo each flow about 700 miles. The largest affluent of the Paraná, next to the Paraguay, is the Salado. This river rises on the southern border of the table-land of the Despoblado under the name of Cachi, and flows through the plains a distance of 800 miles before it joins the Paraná.

There is a peculiar system of drainage in the western Pampas along the base of the Andes, between 31° and 36° S. lat. The waters which descend between these parallels from the eastern declivity of the mountains are collected in three systems of lakes, united by channels by which the surplus water is carried from one system of lakes to the other. As these channels lie from N. to S., it is obvious that the northern system is the most elevated, and the southern the lowest. The rivers and lakes of this region are in many cases impregnated with salt.

Of the rivers falling into the Atlantic south of the La Plata, the chief are the Rio Salado of Buenos Ayres, the Rio Colorado, Rio Negro, Catapuliche, and Rio de la Encarnacion.

Climate and Productions.—The great differences of level within the territories of the Argentine Republic produce a very different climate in the various regions of which it is composed. It is very probable that the difference of heat and cold felt on the table-land of the Despoblado and the countries surrounding the Gran Salina is the greatest that occurs on the American continent, though these regions are less than 300 miles from each other. Extreme heat however is the characteristic of a great part of the country. In the Western Pampas the air is extremely dry, and there is no dew at night; rain also is very scarce. But the Eastern Pampas are a very wet country. Rain occurs all the year round, and a heavy dew falls every night. In these parts sudden changes of the atmosphere are not rare; sometimes they raise or depress the thermometer 20 or even 30 degrees in a few hours. The abundance of moisture in the air and the sudden changes from heat to cold are due to the winds, the worst of which is the *pampero*, or south-west wind, which almost resembles a hurricane.

Respecting the principal objects of agriculture, the Argentine Republic may be divided into two regions, which are separated from each other by the Gran Salina. On the north of it they partake of the intertropical productions: mandioc, rice, Indian corn, and the cocoa plant are cultivated in most of the lower valleys. In the more elevated tracts, tobacco and cotton succeed well, and are cultivated on a large scale. South of the Gran Salina the agriculture resembles that of southern Europe, except that no rice is raised. Wheat and Indian corn are the principal crops, but barley and lucerne are also extensively grown, especially near Mendoza. The northern region also produces some wild plants of great use. The fruit-trees which are cultivated are mostly those of southern Europe, as the vine, orange, fig, olive, peach, apricot, apple, and pear.

Though the cultivation of wheat has increased so much that it now forms an article of exportation, the principal exchangeable wealth of the republic is derived from the herds of cattle. The number of heads is above 4,000,000, of which the province of Buenos Ayres alone is said to possess 8,000,000. They wander about in the pampas nearly in a wild state, and the largest items in the list of exports consist of hides, hair, horns, tallow, and jerked beef. The horses, mules, and asses, probably exceed 2,000,000. Sheep, goats, and hogs, are less common. Most of the wild animals met with in South America inhabit this region.

Gold and silver occur in the Andes, and also in the Sierra de Cordova. Iron and lead are met with in small quantities. There is little coal; but salt is most abundant.

Inhabitants.—The population of the Argentine Republic consists of descendants of Spaniards, and of Indians. The whites have not settled here as masters, as in other countries; farther north, where they have exempted themselves from agricultural labour. They are here cultivators of the ground, and chiefly look after cattle and horses. Those who look after the horses, and are called *gauchos*, live a wild life, and can hardly be said to be superior to the Indians. Their dress is a cloak (poncho), and they live exclusively on beef.

The Indians who are subject to the dominion of the whites are far from being numerous: the number probably falls short of 30,000 individuals. They are only found in the provinces north of the Gran Salina. They are divided into a great many tribes, whose dialects seem for the most part to belong to the language of one aboriginal

nation. Some are completely in a savage state; while others have been taught useful arts by the Jesuits.

The southern tribes have their pasture-grounds south of the Rio Salado of Buenos Ayres, and of 35° S. lat., which line was established in 1740 between them and the Spanish government. These southern tribes are divided into innumerable petty tribes or families, each governed by its own cacique, or *ulmene*, who occasionally claims by hereditary title, but has little authority, except in time of war, when all submit implicitly to his direction. These tribes are frequently quarrelling and fighting with one another, and are only united in their predatory excursions against the whites. They speak a common language, and seem to descend from the same stock as the Araucanians in Southern Chile.

Political Divisions and Population.—Under the Spanish dominion, the countries now comprehended within the Argentine Republic were divided into four intendencias, Buenos Ayres, Cordova, Tucuman, and Salta. When these countries obtained their independence, a new division was made in 1813 and 1814, but as the physical character of the country had not been attended to in making this division, some of the new states again divided. There are now thirteen independent states.

The estimated population of the states of La Plata, in 1836-37, was as follows:—

Buenos Ayres,	from	180,000	to 200,000
Santa Fé		15,000	„ 20,000
Entre Rios		25,000	„ 30,000
Corrientes		35,000	„ 40,000
Cordova		80,000	„ 85,000
Santiago		45,000	„ 50,000
Tucuman		40,000	„ 45,000
Salta		50,000	„ 60,000
Catamarca		30,000	„ 35,000
La Rioja		18,000	„ 20,000
San Luis		20,000	„ 25,000
Mendoza		35,000	„ 40,000
San Juan		22,000	„ 25,000
		595,000	to 675,000

A rough estimate in 1844 gave about 682,000. This is exclusive of independent Indians within the territory claimed by the republic.

1. *Buenos Ayres*, the largest and most populous of the states, has a coast-line along the Rio de la Plata and the Atlantic above 600 miles in length. The whole country is a level plain, with the exception of the districts adjacent to the western boundary. A large portion of it is fit for agriculture, and by far the largest part of the articles exported from Buenos Ayres are drawn from this province, especially cattle, sheep, wool, and corn. As this state alone has a coast-line, and consequently is thus brought into connection with foreign nations, its government, though not by an express agreement, carries on the business of the Argentine Republic with foreign powers.

There is no town of importance in this state, except Buenos Ayres. [Buenos Ayres.] San Pedro and San Nicolas, which are on the banks of the Rio Paraná, contain only from 500 to 800 inhabitants.

2. *Santa Fé* extends along the Rio Paraná. A large part of the surface is unfit for agriculture, though it supplies indifferent pasture for cattle. Cattle and mules are exported. The town of Santa Fé, a meanly-built place, is on the Rio Salado, about 12 or 14 miles above its mouth; it consists of a square, and eight streets branching off at right angles from the corners of it, and contains between 4000 and 5000 inhabitants. Rosario, on the high precipitous banks of the Paraná, has above 1000 inhabitants.

3. *Entre Rios*, so called from being situated between the rivers Uruguay and Paraná, has the great advantage of being abundantly watered by numerous small streams, and has extensive forests which supply fire-wood and materials for carpenters' work. The capital, Villa del Paraná, is built on the top of a lofty gently-sloping cliff. It exports great quantities of hides and tallow, and contains about 6000 inhabitants. Concepçion de la China, on the banks of the Rio Uruguay, is a small place, with 1500 or 2000 inhabitants, and some trade with Monte Video.

4. *Corrientes* comprehends the northern portion of the peninsula formed by the two rivers Paraná and Uruguay. The capital, Corrientes, is situated below the confluence of the Rio Paraná with the Paraguay, and stands on a considerable elevation. It is rather well built, and contains 4500 inhabitants. Santa Lucia is also a place of some importance on the Paraná, with a population of about 2000.

The *Missiones*, which, according to the treaty between Brazil and Buenos Ayres, in 1828, are to constitute an independent republic, extend eastward from Corrientes, between the Paraná and Paraguay to the confines of Brazil. This fertile tract, which was very populous under the sway of the Jesuits, has been since almost desolated.

5. *Cordova* comprehends the Sierra de Cordova and the surrounding hilly country, with some adjacent plains. The valleys within the Cordova mountains, and those which extend along their sides, have a fertile soil, and maize and fruits are raised there in abundance. Cordova, the capital, has a population of 14,000. The streets are regularly laid out, and the houses are built of brick, and are better built than in other towns in the interior; most of them have balconies. In the centre of the town is a spacious square, on one side of which is a neat town-hall, and on the other a fine cathedral. There are several other well-built churches. Alta Gracia, a neat town near the base of the Sierra de Cordova, contains 3000 inhabitants.

6. *Santiago* has great fertility in the neighbourhood of the river Dulce, producing plentiful crops of wheat and some good grass. The inhabitants, among whom are many Indians, are industrious, and manufacture *ponchos* (cloaks) and coarse saddle-cloths or blankets. Santiago del Estero, on the right bank of the Rio Dulce, has about 4000 inhabitants, and exports cochineal and ponchos to Tucuman and Peru. Matara is a small place on the Rio Salado, where it begins to be navigable.

7. *Tucuman* is the best-cultivated state in the Argentine Republic. The capital, San Miguel de Tucuman, which stands on an elevated plain, has a hot but dry and salubrious climate. The inhabitants exceed 8000. It carries on a considerable trade in cattle and mules; the latter are sent to Bolivia.

8. *Salta* occupies the northern portion of the territories that belong to the Argentine Republic, and has every variety of soil and climate. Salta, the capital, is situated in a plain about ten miles wide and forty long. The streets are regular, but narrow, and the houses are of brick, but not large. In the centre of the square are the government-house, the cathedral, and several public buildings. The population is estimated at 8000 or 9000. Jujuy and Oran are two small towns in this state.

9. *Catamarca* consists of some valleys, running between mountain-ranges S.E. and N.W., and terminating, at their southern extremity, on the borders of the Gran Salina. The capital is Catamarca, the population of which is about 4000.

10. *Rioja* comprehends the country between the Gran Salina and the Andes, from 28° to 31° S. lat. It has some rich silver mines, and produces wine, wheat, and vicuña wool. The chief town, Arauco, has 4000 inhabitants.

11. *San Juan* extends along the eastern declivity of the Andes, from 30° 30′ to 32° S. lat. In the northern district, called Jachal, there are some gold-mines, the produce of which is not great. The capital, San Juan, on the banks of the Rio de San Juan, is stated to have a population of 8000. It is the entrepôt of the wines and brandies which are sent to the other states.

12. *Mendoza* extends from 32° to 35° S. lat., along the foot of the Andes. It contains the volcanoes of Aconcagua, Maypu, Rancagua, and Peteroa, and the Andes are here crossed by the most frequented roads which lead over the mountain-passes of Uspallata, Portillo, and Las Damas. The vineyards and plantations of fruit-trees are extensive. The dried fruits consist of figs, peaches, apples, nuts, and olives. Mendoza, the capital of the state, is a neat and pleasant town. The houses are only one story high, and have porticos. The population may amount to 12,000. San Martin, or Villa-nueva, west of Mendoza, is a thriving place, with 2000 inhabitants.

13. *San Luis* comprehends that immense tract of country which extends between the state of Mendoza on the west and that of Cordova on the east. No part of it possesses any considerable degree of fertility. San Luis de la Punta, the capital, is a poor village-like town, with 1500 inhabitants.

The countries within the boundaries of the Argentine Republic which are not included in the territories of any one of these thirteen states, occupy perhaps one-fourth of its area. As the inhabitants are, with few exceptions, nomadic tribes, there are no towns.

Manufactures and Commerce.—The most important branch of manufacturing is that of *ponchos*, or oblong square pieces of woollen cloth, with a hole in the middle, to pass the head through; they are used by the gauchos and other people as cloaks. The finest are made of vicuña skins, in the town of Santiago del Estero. Some woollen fabrics for men and women's dresses are also made, as well as saddle-cloths. In some parts some coarse cotton-cloth was formerly made by the country-people for their own use, but this branch of domestic industry has been nearly abandoned since the introduction of British manufactures.

The internal commerce of the state is considerable, as most of them have some products which are either not at all or only to a small amount raised in the neighbouring states. The external commerce under Spain was very small; but it has greatly increased within the last few years. Trade is now carried on with all the principal countries of Europe, and with various parts of America. The value of the British and Irish produce and merchandise exported to the Argentine States, between 1836 and 1846, varied from 590,000*l.* to 990,000*l.* annually.

History.—The wide æstuary of the Rio de la Plata was discovered by Juan Diaz de Solis, who was sent to these parts in 1512; but Sebastian Cabot was the first to make a settlement in the country, in 1530. Various districts were visited and towns built during the same century; and all the countries thus conquered were joined to the viceroyalty of Peru, of which they formed a portion until 1777, when Buenos Ayres was divided from it, and constituted a separate viceroyalty. In the 17th century the Jesuits entered the country for the purpose of civilising the Indians and converting them to Christianity. Their progress was at first slow, but after the year 1692, when they obtained more extensive privileges, they made great progress in their work.

In 1805 the town of Buenos Ayres was taken by the British, but they were soon expelled. The inhabitants of the Argentine Republic, like those of the other Spanish colonies, did not submit to the authority of Joseph Bonaparte, and in 1810 they organised an independent government in the name of King Ferdinand VII. But after Ferdinand recovered the throne of Spain, his measures respecting the American colonies created such disgust, that the states united and declared their independence in the town of San Miguel de Tucuman, the 9th of July, 1816.

PLATÆA, or PLATÆÆ, was a city of Bœotia under the ridge of Mount Cithæron, about 60 stadia, or rather more than 7 miles, south-west of Thebes. The Platæans became allies of Athens B.C. 519; and they aided the Athenians in the battles of Marathon and Artemisium, and of Platæa, B.C. 479. They were also the allies of Athens in the Peloponnesian War; and on their refusal to give up this alliance, their city was besieged by the Lacedæmonians, and when it was captured, the men were put to death, with the exception of some who had escaped in a sortie in the night (B.C. 427).

PLATFORM, for guns, mortars, &c., is a floor of timber or a pavement of stone, of a rectangular form, which is laid on the ground for the support of a piece of ordnance, and to prevent the wheels of its carriage from sinking.

PLATANTHE'RA is a genus of Orchidaceous plants. The species are numerous, and inhabit the temperate parts of the Old World, but are rarely ornamental, and none are of any known use. The British Flora contains two species, *P. bifolia*, and *P. chlorantha*, both white flowered, and called Butterfly Orchis.

PLATANUS. [PLANE.]

PLA'TINA, or PLA'TINUM, an important metal, which was first made known in Europe by Mr. Wood, assay-master in Jamaica, who met with its ore in 1741. Platina is separated from the sand and other matters with which it is mixed, by washing with a great quantity of water, from which the heavier parts of course subside, and these contain the ore in question. The ore of platina is composed of irregular rounded grains, which are sometimes flattened; they are of various sizes, often very small, and occasionally they exhibit traces of crystallization; but these are probably derived from the presence of some other metal. The ore, which has a specific gravity of 17.33, contains traces of six or seven other metals.

The process of purifying platina and of rendering it malleable is one of considerable complication and difficulty, and it is one which our space will not permit us to detail; we therefore merely refer to the late Dr. Wollaston's extremely interesting paper on the subject, contained in the 'Philosophical Transactions' for 1829.

The following are the properties of pure platina:—Its colour is grayish-white, intermediate between silver and tin. When it is free from iridium, it is so very ductile that it may be drawn into very fine wire, not exceeding the 2000th part of an inch in diameter; it is also very malleable, and may be beaten into thin leaves. According to Berzelius, when perfectly pure, it is softer than silver, and it is susceptible of receiving a fine polish. Of all metals it is the least expansible. Its density varies: when fused, it is 19.50; when forged, it is as high as 21.4 to 21.5.

Platina suffers no change by exposure to the air, nor is it oxidized when heated in it. It does not under any circumstances decompose water. It is infusible in the strongest heat of a smith's forge, but it may be melted by voltaic electricity or by the oxyhydrogen blowpipe. Of all metals, except iron and copper, it is the most tenacious: a wire of the diameter of $\frac{1}{15}$th of an inch, is capable of sustaining a weight of about 274 pounds. Like iron, platina possesses the very valuable property of welding at a high temperature, and this enables us to form it into chemical vessels of great and daily use.

Oxygen and *Platina* form three compounds. The *Protoxide* ($P^1 O^1$) is nearly black, very bulky, and has a good deal the appearance of charcoal. It decomposes readily and even with detonation at a heat below redness. The *Sesquioxide* ($P^2 O^3$) is a grayish powder. The *Binoxide* ($P^1 O^2$) is a black compound, which combines with most acids, but more readily with alkalies to form salts.

Chlorine and *Platina* form two compounds. The *Protochloride* ($P^1 Chl.^1$) is green, unalterable in the air, insoluble in water, or in sulphuric or nitric acid. At a high temperature it is totally decomposed, the chlorine being expelled, and metallic platina left. The *Bichloride* ($P^1 Chl.^2$) is deliquescent; very soluble in water, alcohol, and æther, and the solutions which it forms are of a pure yellow colour; light decomposes them, metallic platina being deposited. *Bromine* and *Platina* combine to form a *Bromide* ($P^1 B^2$), a reddish-brown substance, decomposible by heat.

Carbon and *Platina* form a *Carburet* ($P^1 C^2$), in the state of a black powder. *Sulphur* and *Platina* form two compounds. The *Protosulphuret* ($P^1 S^1$) is a gray or blackish powder of a metallic lustre, unaltered by exposure to air or water, and scarcely attacked even by boiling acids. The *Bisulphuret* ($P^1 S^2$) is a black powder. *Phosphorus* and *Platina* combine to form a hard, brittle, fusible silvery-white *Phosphuret*.

Iodine and *Platina* form two compounds. The *Protiodide* ($P^1 I^1$) is a black, heavy, finely-divided precipitate, which adheres to the fingers like charcoal; it has neither taste nor smell; is unalterable in the air, and neither water nor alcohol acts upon it at any temperature. It may be heated to above 482° Fahr. without decomposing. The *Bi-iodide* ($P^1 I^2$) is a crystalline black powder, inodorous, insipid, and stains the fingers like the protiodide. *Boron*, *Selenium*, and *Silicium* also combine with platinum to make binary compounds.

Most metals combine with platina. The alloys so produced are generally hard and brittle, but some of them are fusible and ductile.

Salts of Platina, or Oxysalts, consist of acids and the oxides of the metal: they are not numerous, and have been but imperfectly examined. The chief among them are the *Protosulphate*, *Protonitrate*, *Persulphate*, and *Pernitrate*.

Salts of the Protoxide. These are of an olive-green or greenish-brown colour, and they are soluble in an excess of alkali, which renders them green.

Salts of the Peroxide are yellowish-red or brownish-red; most of them are soluble in water, and perfectly decomposed at a white heat, leaving metallic platina; and thus is obtained the metal in that finely divided state in which it is called *Spongy Platina*.

The uses of platina are numerous and important; but it is especially employed for forming vessels, not merely for chemical operations on a small scale, but for the concentration of sulphuric acid by manufacturers.

PLATING. [ELECTRO-METALLURGY.]

PLATO, an Athenian, the son of Ariston, was born B.C. 429. He received the best education that could be had at Athens. His acquaintance with Socrates is said to have commenced in B.C. 410. On the death of Socrates, B.C. 399, Plato, with some of the disciples of Socrates, retired to Mégara, where he is said to have attended the lectures of Euclid. From Mégara he went to Cyréne to visit Theodórus, the mathematician; and from Cyréne it is said that he went to Egypt, and staid there thirteen years; but, if he did visit Egypt, it is improbable that he resided there so

long. It is also stated that he visited Tarentum in Italy; and, if this is true, it is probable that on this occasion he paid the first of his three visits to Sicily, in B.C. 389, being then 40 years of age. In Sicily he became acquainted with Dionysius I., tyrant of Syracuse, with his son, Dionysius II., and with Dion. His freedom of speech offended the elder Dionysius, who induced Pollis, the Spartan ambassador, in whose ship he was returning to Greece, to sell him for a slave in Ægina. He was bought by Anniceris of Cyrene, who set him free, and, on his return to Athens, he set up a school in the Academy, where he taught twenty-two years. He made a second voyage to Syracuse at the request of Dion, probably in B.C. 367, and stayed a few months. His third voyage to Sicily was made in B.C. 361, with the view, as it is sometimes stated, of reconciling Dion and his nephew, the younger Dionysius. Plato's residence with the tyrant was neither pleasant nor safe, and he obtained permission to return to Athens in the following year. Plato spent the rest of his life at Athens in teaching and writing. His lectures were first delivered in the garden of the Academy, and afterwards in a garden which he purchased. He died in B.C. 347, and was succeeded as a lecturer in the Academy by his nephew Speusippus.

Plato had a long list of scholars, among whom were Speusippus, Aristotle, Xenócrates of Chalcédon, and many others. The works of Plato consist of Dialogues; in all of which, except the 'Laws,' Socrates is the principal speaker. These dialogues contain his system of philosophy, which however is rather critical than dogmatical; and many of his dialogues are rather reviews of the speculations of former philosophers than formal enunciations of his own doctrines. Besides the opinions of Socrates, he was well acquainted with those of Pythagoras, Heraclítus, Parmenides, Zeno, Anaxagoras, and Protagoras, and his works abound in references to the writings of these philosophers; indeed some of his dialogues are controversial tracts directed against one or more of them. The Pythagorean philosophy had great influence on the opinions of Plato; and Cicero says that 'he interwove the eloquence and subtlety of the Socratic mode of arguing with the obscurity of Pythagoras and the many branches of learning which the Pythagorean philosophy included.' Whatever Plato may have adopted from Socrates and others, the merit of an enlarged and comprehensive understanding, and of giving form and expression to many profound ideas, probably hitherto obscurely conceived, is indisputably his. His works were always highly valued, a circumstance which will account for the complete collection of them having been preserved; and indeed there are several dialogues in the collections which are generally allowed to be spurious. These dialogues have been arranged by the critics in chronological order. It is remarked that the long dialogue on 'Laws' presents a great contrast with the style of the genuine dialogues of Plato; and it is also observed that it is but loosely connected with the general system of Plato's works; a remark that has very little weight, or perhaps none at all. However it is not disputed that the 'Laws' is a genuine dialogue of Plato. According to their matter his dialogues have been distributed into three classes, Dialectical, Ethical, and Physical; and, though the formal division of philosophy into these three parts is subsequent to Plato's time, the notion of such a division was evidently familiar to him.

The character of Plato's writings can only be appreciated by a careful study of them, or of his best expositors, who are numerous. The dialogues of Plato, in point of style, have the highest merit; they are enlivened by great dramatic effect, and the language possesses, in a most wonderful degree, clearness, simplicity, and force. As specimens of literary composition they stand unequalled. The influence of Plato and his pupil Aristotle, who was an antagonist of his master, on the philosophical speculations of all the nations of Europe, has been continued from that time to the present day; for, though both these writers have been read by few, and understood by fewer still, all the great writers on philosophy and morals have been in some degree acquainted with them, and have drawn something from these sources.

The Greek text of Plato was first established on a careful collation of all the MSS. by Imm. Bekker, Berlin, 1816-1823. There is a complete French translation of Plato by Victor Cousin; and a German translation by Schleiermacher of some of the dialogues. Thomas Taylor's English version is far from being satisfactory. The translations by Floyer Sydenham are very good; but he only completed part of his design.

PLATTSBURG. [NEW YORK.]

PLATYCA'RCINUS, Latreille's name for a genus of *Cancerians;* it is the *Cancer* of Leach.

Example. — *Platycarcinus Pagurus* (*Cancer Mœnas*, Rond.; *Cancer Pagurus*, Linn. and Herbst; *Cancer fimbriatus*, Olivi.).

This is the well known Black-Clawed or Edible Crab, a native of our coasts, and so highly prized for the table. It is the *Tourteau, Poupart, Houvet*, &c., of the French, and *Partan* of the Scotch.

PLATY'LOPHUS, Mr. Swainson's name for a genus of conirostral birds arranged by him as a subgenus of *Barita* [BARITA], in the subfamily *Corvinæ*, or typical Crows, family *Corvidæ*.

Example.—*Platylophus galericulatus* (*Garrulus galericulatus* of Vieillot).

PLATY'MERA, a name given by M. Milne Edwards to a very remarkable genus of *Brachyurous Crustaceans*, which is placed by him in the tribe of *Calappians*, connecting on one side the *Calappæ* and *Mursia*, whilst it is also approximated by other characters to the *Cancerians*.

PLAUEN, the chief town of the Voigtland circle, in the kingdom of Saxony, is situated on the White Elster, 70 miles by railway S. from Leipzig. It is pretty well built, and has 10,000 inhabitants. Among the public buildings there are two churches, the royal palace, the lyceum, the normal schools, two hospitals, and two orphan asylums. The chief manufactures consist of muslins and other cotton goods, gauze, stockings, net-lace, bobbin-net, buttons, oil-cloth, and brandy.

PLAUTUS, MARCUS ACCIUS, is said to have been born at Sarsina in Umbria. A story is told that he began writing comedies very early and made some money by selling his works to the ædiles, who had the superintendence of dramatic representations at Rome. Upon this he embarked in trade, lost his money, and entered the service of a baker, and during this time he wrote three comedies. Nothing in fact seems to be known of the life of Plautus, except half-credible stories. As he gained a great reputation as a writer of comedies, we may infer that he left his master, the baker, when his fame was established. Cicero says that he died B.C. 184.

He wrote a great number of comedies in Latin; and indeed a greater number was attributed to him than he actually wrote. He may have revised and improved some of the works of earlier Roman dramatists, and after his death others may have been passed off as his, as there are always persons ready to publish inferior matter under the cover of a great name. Twenty plays which go under the name of Plautus are still extant. Cicero and other ancient writers speak highly of Plautus, and commend his humour and comic power. He is undoubtedly one of the first comic writers that have ever existed, if not the first of all; and if there are some objections to be made to him, we must take into account the time when he lived, for every comic writer must be measured by his age.

Several of the titles of the plays of Plautus are the same as, or similar to, those of Philémon, Díphilus, and Antiphon. He undoubtedly derived something from the Greek models of the Middle Comedy. His characters are Greek with Greek names, and yet the manners and customs are chiefly Roman, and his allusions to Roman institutions and legal rules are numerous. It seems likely that he had often a Greek model to work upon, though this may not have always been the case. It would be difficult to find fault with some of his best comedies; and indeed Lessing has pronounced the 'Captivi' to be faultless. His metre, which is generally considered harsh and irregular, is not so when his verses are properly read and the words are abbreviated in pronunciation as they ought to be in reading, and as they undoubtedly were on the stage.

There is yet no complete edition of the plays of Plautus which is worthy of the author. There is an edition by J. F. Gronovius, Leyden, 1664. The comedies of Plautus have been translated into most of the languages of Europe. There is an English translation by Bonnel Thornton, 'The Comedies of Plautus translated into familiar blank verse,' London, 1767, 2 vols. 8vo.: it was continued by Richard Warner.

PLAYFAIR, JOHN, was born at Benvie in Forfarshire, March 10, 1748. His father was minister of the united parishes of Liff and Benvie. At the age of 14 he was sent to the University of St. Andrews.

In 1766, when 18 years old, he distinguished himself, though he was not successful, as a candidate for the professorship of mathematics in Marishall College, Aberdeen. In 1772 he obtained the living of Liff and Benvie, and entered, in 1773, upon the duties of the ministry. The first fruit of his leisure hours was a paper inserted in the Transactions of the Royal Society of London, for 1779, 'On the Arithmetic of Impossible Quantities.'

He resigned his living, in 1782, to superintend the education of the sons of Mr. Ferguson of Raith; and in 1785 he was appointed professor of mathematics, jointly with Dr. Adam Ferguson, in the university of Edinburgh. In 1789 he succeeded Dr. Gregory as secretary to the physical class of the Edinburgh Royal Society, to which he was appointed general secretary on the death of Dr. Robinson, in 1805, whom he likewise succeeded as professor of natural philosophy in the university of Edinburgh. This obliged him to resign the chair of mathematics.

His intimacy with Dr. James Hutton led to his becoming a strenuous supporter of the geological theory which bears his name. His 'Illustrations of the Huttonian Theory of the Earth,' Edin., 1802, 8vo., have been greatly admired. Nevertheless Mr. Playfair was fully aware of the insufficiency of the existing data relative to the subject; and, besides many journeys undertaken for the purpose of examining the geological features of his own country, immediately after the restoration of peace, in 1815, he set out upon a geological tour through France, Switzerland, and Italy, in search of materials for an enlarged edition of his 'Illustrations,' which however other occupations prevented him from maturing for the press. He died at Edinburgh, July 19, 1819.

From the year 1804 he was a frequent contributor to the 'Edinburgh Review.' His articles in that periodical are reprinted in the fourth volume of the collected edition of his works, published at Edinburgh in 1822, in 4 vols. 8vo., to which is prefixed a memoir of the author by Dr. James G. Playfair. He contributed two or three articles to the 'Encyclopædia Britannica.' His contributions to the 'Transactions of the Edinburgh Royal Society' are very numerous; they also are included in the collection.' He also published 'Elements of Geometry,' Edin., 1795, 8vo., and 'Outlines of Natural Philosophy,' Edin., 1812 and 1816, 2 vols. 8vo.

PLAYHOUSE. [THEATRE.]

PLEA. [PLEADING.]

PLEADING *at Common Law.* Pleadings are the allegations of the respective parties to a cause expressed in technical language. In order that a decision may be made upon disputed rights, it is necessary that the points to be decided should be clearly ascertained, and this is effected by the system of special pleading, by which the points in controversy are presented for decision unincumbered with extraneous matter.

Actions are commenced either by Writ or by Plaint; by writ, if the court in which the action is brought cannot take cognizance of a complaint without the royal authority in the particular cause; by plaint if the court is empowered to proceed without royal authority. This writ till lately issued out of chancery, and was called the Original Writ, by which name it was distinguished

from process issued, after the commencement of a cause, by the court which the original writ had authorised to take cognizance of the cause. The original writ stated briefly the nature of the complaint. After the defendant appeared in court to answer the proceedings against him, he was entitled, within a certain time, to receive from the plaintiff a more particular statement of the nature of the complaint. This statement was called the Declaration, Narratio, or Count, though the last of these terms is now more commonly used to denote one of the several distinct matters of complaint comprised in the same declaration.

Within a certain number of days, varying according to circumstances, after the delivery of the declaration, the time for pleading arrives; the term 'pleading' being here used in the limited sense of the answer which is made by the defendant to the declaration. In answering the declaration, the defendant is not allowed to accumulate his objections both of law and of fact in one defensive pleading. The matters of fact are pleaded by themselves, and are the questions which are submitted to the jury.

The defendant may admit the complaint set out in the declaration either by express acknowledgment or by silence. In either case the court pronounces judgment against him: in the former case, upon his Cognovit Actionem, or confession; in the latter, upon his default, or, as it is termed, by Nil Dicit. Or he may decline to answer the charge contained in the declaration, on the ground that the court has not jurisdiction of the matter; or that the plaintiff is not entitled to sue, as being an outlaw, foreign enemy, or the like; or that the defendant is incapable of being sued, as being an infant; or for other reasons which he may allege. This is called Pleading in Abatement, because the defendant prays that the court will abate (put down) or quash the proceedings. Or the defendant admitting, for the present purpose at least, that the facts stated in the declaration are true, may insist that these facts give the plaintiff no cause of action against him; he may accordingly rest (demur) upon the facts as they appear in the declaration, and call upon the court to give judgment in his favour upon that state of facts. This form of pleading is called a Demurrer. Or the defendant may answer the complaint, or, as it is technically called, he may 'plead to the action;' and that in one of two ways: he may deny some material allegation in the declaration which is necessary to the maintenance of the action; and, before the rules of pleading promulgated in 1834, he might in a variety of actions plead one denial of the whole declaration;—this was called Pleading the General Issue, which is now permitted in those actions only in which it is expressly authorised by statute. A plea denying either one or all of the allegations in the declaration must 'conclude to the country,' that is, the defendant must state his readiness to submit to the decision of a jury (who are called 'the country,' as contradistinguished from 'the court') the truth of the matter of fact asserted in the declaration and denied in the plea. It is the same if the plea asserts a fact denied in the declaration; and in either case the defendant is said to 'take Issue.'

The second mode of Pleading to the Action is by putting in a Special Plea, which either expressly, or, according to modern practice, tacitly, admits the truth of the allegations contained in the declaration, but which not only confesses but also avoids them. The special plea (whence the whole system is often called Special Pleading) introduces some new fact or facts, the effect of which, if true, is to show that notwithstanding the facts alleged in the declaration, the plaintiff is not entitled to maintain his action. As it is yet uncertain whether the plaintiff will deny this new matter or will admit it to be true, there can be no conclusion to the country upon such a plea, but the defendant prays the judgment of the court in his favour, in anticipation of the new matter alleged being admitted or proved; and if that new matter contain an affirmative proposition, the defendant must conclude his plea with a verification, that is, an offer to prove it if its truth should be controverted on the other side. This is called 'tendering an Issue.'

The next pleading on the part of the plaintiff will be regulated by the course pursued by the defendant. If the defendant has confessed the action or made default, the plaintiff has nothing to do but to pray that the court will pronounce a judgment agreeable to the confession, or one consequent upon the default. If the defendant has pleaded in abatement, the plaintiff either acquiesces in the action being quashed, or he demurs to the plea as not showing sufficient matter for quashing the proceedings, or he replies to the plea either by taking issue (denying) some material allegation in the plea, or by confessing and avoiding the plea, alleging some matter which, consistently with the truth of the plea, destroys its effect and shows that the proceedings ought not to be quashed. If the plaintiff demurs to the plea in abatement, the defendant must either abandon that plea and put in a plea to the action, or he must join in demurrer. If, upon the argument of the demurrer, the court are of opinion that the plea in abatement is good, they give judgment that the proceedings be quashed; if they are of opinion that the plea is bad, the judgment is, that the defendant 'answer over' (quod respondeat ouster), in other words, that he plead to the action.

If the plaintiff take issue upon the plea in abatement, the defendant is bound to join issue, that is, to accept the mode of trial offered, and if upon a trial the issue be found for the defendant, he has judgment that the proceedings be quashed; but if the verdict be for the plaintiff, the judgment is, not that the defendant answer over, but that the plaintiff recover his demand against the defendant.

If the defendant has demurred to the declaration, the plaintiff either abandons the action or he applies to the court for leave to amend his declaration; or he joins in demurrer, asserting that the declaration is sufficient to support the action. This demurrer and joinder form 'an Issue in Law,' or a question between the parties to be decided by the court after hearing the matter of law argued.

The plaintiff's answer to the defendant's plea, whether in abatement or in bar, is called a replication. If the defendant has taken issue, by pleading in denial of part or of the whole of the declaration, the plaintiff must join issue, which is done by adding to the defendant's appeal to a jury the words 'and the plaintiff doth the like,' formerly 'et querens inde similiter,' whence this step is called 'adding the similiter.' If the defendant has pleaded specially, the plaintiff may either take issue upon the new matter alleged, and conclude to the country, or he may plead new matter, thus in his turn confessing and avoiding the defendant's plea. Whenever in the course of the pleading in a cause, one party takes a proper issue upon an allegation of his adversary, that adversary is bound to join issue and go to trial before a jury; but when, instead of taking issue, new matter is pleaded, the adversary has the option of taking issue upon that new matter, of confessing and avoiding it, or of demurring to it. The pleadings may thus go on through several more stages. The defendant's answer to the plaintiff's replication is called a Rejoinder; the plaintiff's answer to the rejoinder is called a Surrejoinder; the defendant's answer to the surrejoinder is a Rebutter; and the plaintiff's answer to the rebutter is a Surrebutter. The proceedings might go on ad infinitum, but for a very salutary rule which forbids a party from alleging anything inconsistent with, or even not corroborative of, his previous pleading. A violation of this rule is called 'a departure in pleading,' and is attended with fatal consequences to the party guilty of it.

PLEADING *in Equity* is doubtless derived from the process of Pleading at Law; but there are many differences.

The plaintiff's declaration in Equity is called his Bill; and the answer of the defendant or defendants is put in upon oath, except in the case of persons who have privilege of peerage, and in the case of a corporation; and the plaintiff may use the whole of the defendant's answer as evidence against him at the hearing of the cause, or such integral part of it as he may think proper. He may also, by means of the admissions contained in the answer, obtain the inspection of books, papers, and writings in the defendant's possession, which support his (the plaintiff's) claim, and he may use them as evidence at the hearing of the cause. The defendant, except on the question of costs, can make no use of his own answer, further than as showing what his defence is; and he must support this defence by evidence, just in the same way as the plaintiff must prove those parts of his case which he cannot prove by the admissions in the defendant's answer. Any number of plaintiffs may join in a suit, if they have all a common interest, however unequal in value, in the subject-matter of the suit; and a common interest means such a legal or equitable title to the subject-matter of the suit, or to some part of it, as will entitle them to a decree which shall affect the defendants. All the plaintiffs in a suit are considered one, as appears from the general rule that a suit is abated by the death of a plaintiff or the marriage of a female plaintiff; and also from the rule that a person who has no interest in the subject of the suit cannot join as a plaintiff with one who has. But the suit is a different suit against each defendant, for each defendant may answer separately to the bill; and no defendant is affected in any way by the answer of a co-defendant. If a defendant dies, the suit abates as to him, but continues as to the other defendants, though it is nearly always necessary to restore the integrity of the suit by making the personal representative or the heir-at-law of the deceased defendant a party to it.

The writ of Subpœna is the original process by which a party is brought before the court. This writ formerly required the person to whom it was addressed to appear and answer the complainant's bill under a penalty of 100*l*. The present form of subpœna requires the person to whom it is addressed to appear and answer 'upon pain of an attachment issuing against his person, and such other process for contempt as the court shall award.' Those who have privilege of peerage are required to appear and answer by a Letter Missive from the Lord Chancellor.

Every person who files a bill is entitled to have a subpœna, and the person who has been served with such subpœna is bound, within a time fixed by the rules of the court, to demur, plead to, or to answer such bill. The origin of this writ of subpœna, or at least the adoption of it in a court of equity, is usually attributed to John Waltham, bishop of Salisbury, master of the rolls in the reign of Richard II.

For further particulars as to Pleading in Equity, professional books should be consulted, such as West's 'Simboleography,' p. 194, ed. 1622, Mitford's 'Pleadings,' and other professional works.

PLECTRANTHUS, a genus of plants belonging to the natural order *Labiatæ*. *P. crassifolius* is esteemed in India both as a perfume and a spice, being equally valued in the toilet and the kitchen. The Patchouly, so inimical to vermin and so efficacious in preserving clothes from moth, is said to be the leaves of *P. graveolens*, which have a very powerful odour, but the comminuted state in which it is imported renders this uncertain.

PLEDGE is a thing bailed (delivered for a temporary purpose) as a security to the bailee (receiver), for the performance of some engagement on the part of the bailor (the deliverer). When the pledge is for a debt, more especially where it is given to secure a loan at interest, it is commonly called a pawn. The pledge is sometimes, though rarely, given for the sole benefit of the pledgee, as where, after a contract is made, one party gives to the other a pledge for its performance. Secondly, which is the ordinary case, the pledge may be for the mutual benefit of bailor and bailee, as in the case of a loan of goods on hire, or of money at interest, when the receiver of the money or the goods delivers to the other party something of value as a security. Thirdly, the pledge may be given for the purpose of obtaining a gratuitous loan of goods or of money, or of procuring some other advantage to the bailor only. It would appear that in the first of these three

cases the bailee would be liable for the consequences of slight negligence; in the second, for the consequences of the want of ordinary care; and in the third, for gross negligence only.

The pledgee is bound to return the pledge and its increments, if any, upon being requested so to do, after the performance of the engagement. This duty is extinguished if the pledge has ceased to exist by some cause for which the pledgee is not answerable. When the full amount of the debt or duty therefore is tendered and refused, and the pledge is detained, the pledge is at the sole risk of the pledgee. In every case where the pledge has sustained injury from the wrongful act or default of the pledgee, the owner may recover damages to the amount of the injury, in an action on the case.

The contract of pledge may be extinguished by the performance of the engagement for which the pledge was given, or by satisfying the engagement in any other manner, either in fact or by operation of law, as by the acceptance of a higher security without an express stipulation that the pledge shall continue.

If the engagement, to protect which the pledge is given, be not performed within the stipulated time, the pledgee may sell, upon giving due notice to the pledgor. If no time be stipulated, the pledgee may give notice that he requires a prompt fulfilment of the engagement, upon non-compliance with which he may sell.

The possession of the pledge does not affect the right of the pledgee to enforce performance of the engagement, unless there be a special agreement, by which he has engaged to resort to the pledge only, or to look to it in the first instance.

Though the pledgee may sell, he cannot appropriate the pledge to himself upon the default of the pledgor; nor is he at liberty to use it without the permission of the owner, expressed or clearly implied. Such an implication arises where the article is of a nature to be benefited by or to require being used, in which latter case the use is not only justifiable, but indispensable to the discharge of the duty of the pledgee.

As to the power of an agent to pledge, see FACTOR; and as to the making land a security for debt, see MORTGAGE.

PLEI'ADES. [TAURUS.]

PLEIOCENE. By this title (derived from πλεῖον, more, and καινός, new) Mr. Lyell characterises the upper part of the Tertiary Strata. There are in his view older and newer Pleiocene Formations, and some have used for the latter class the expression Pleistocene, or most new.

PLEKOCHEI'LUS, the Rev. Lansdown Goulding's name for a genus of terrestrial gastropodous mollusks (Shelled Snails), belonging to his family *Pupadæ*, and included under the genus *Bulimus* by authors.

Example.—*Plekocheilus undulatus*. Locality, the forests of the Island of St. Vincent.

PLENIPOTENTIARY. [AMBASSADOR.]

PLEODONTS, the name assigned by MM. Duméril and Bibron to their first subfamily of *Lézards Lacertiens* (Lacertian Lizards), or *Sauriens Autosaures* (Autosaurian Saurians).

The Pleodonts are divided into two great groups: the first, with a compressed tail, surmounted with crests, as in the Crocodiles; the other, with the tail perfectly conical, or very slightly flattened on its four surfaces, so that it still appears rounded. MM. Duméril and Bibron have employed the expression Cyclotetragonal to designate this mixed form.

In the subfamily of the Pleodonts these distinguished zoologists have placed the species whose teeth are completely solid, being without any internal cavity, and very firmly fixed by their edges and their external surface to the jawbones, in a groove hollowed out along their internal border, against which the teeth, especially the anterior ones, are so applied that their point or free extremity seems to be always a little directed outwards.

PLESIOSA'URUS, the Rev. W. D. Conybeare's name for an extinct genus of an extinct family, the *Enaliosaurians*, and first described by him, with the assistance of Sir H. De la Beche, in the 'Transactions of the Geological Society of London,' in 1821. A restoration of the skeleton, together with that of *Ichthyosaurus*, was given by Mr. Conybeare in a subsequent volume of the same 'Transactions' (1824), from an almost perfect specimen of *Plesiosaurus dolichodeirus*, and the accuracy of this restoration is still universally acknowledged. This genus is the *Halidracon* of Wagler.

Professor Owen in his 'Report on British Fossil Reptiles,' made to the British Association for the Advancement of Science, treats largely on the *Enaliosaurians*, or extinct Lizards of the sea, animals of gigantic size, and carnivorous appetite.

The following species, sixteen in number, are recorded by Professor Owen:—*Plesiosaurus Hawkinsii*, Owen; *dolichodeirus*, Conybeare; *macrocephalus*, Conybeare; *brachycephalus*, Owen; *macromus*, Owen; *pachyomus*, Owen; *arcuatus*, Owen; *subtrigonus*, Owen; *trigonus*, Cuvier; *brachyspondylus*, Owen; *costatus*, Owen; *dædicomus*, Owen; *rugosus*, Owen; *grandis*, Owen; *trochanterius*, Owen; and *affinis*, Owen.

Habits of Plesiosaurus.—Dr. Buckland truly observes that the discovery of this genus forms one of the most important additions that geology has made to comparative anatomy. 'It is of the Plesiosaurus,' says that graphic author, in his 'Bridgewater Treatise,' 'that Cuvier asserts the structure to have been the most heteroclite, and its characters altogether the most monstrous that have been yet found amid the ruins of a former world. To the head of a lizard it united the teeth of a crocodile, a neck of enormous length, resembling the body of a serpent, a trunk and tail having the proportions of an ordinary quadruped, the ribs of a cameleon, and the paddles of a whale. Such are the strange combinations of form and structure in the Plesiosaurus; a genus, the remains of which, after interment for thousands of years amidst the wreck of millions of extinct inhabitants of the ancient earth, are at length recalled to light by the researches of the geologist, and submitted to our examination in nearly as perfect a state as the

bones of species that are now existing upon the earth.' Conybeare thus speaks of the supposed habits of this extinct form, which he had in a manner built up before our eyes, when materials were very scanty compared to those which have since been discovered:—'That it was aquatic is evident from the form of its paddles; that it was marine is almost equally so, from the remains with which it is universally associated; that it may have occasionally visited the shore, the resemblance of its extremities to those of the turtle may lead us to conjecture; its motion however must have been very awkward on land; its long neck must have impeded its progress through the water, presenting a striking contrast to the organization which so admirably fits the Ichthyosaurus to cut through the waves. May it not therefore be concluded (since, in addition to these circumstances, its respiration must have required frequent access of air) that it swam upon or near the surface, arching back its long neck like the swan, and occasionally darting it down at the fish which happened to float within its reach? It may perhaps have lurked in shoal water along the coast, concealed among the sea-weed, and, raising its nostrils to the surface from a considerable depth, may have found a secure retreat from the assaults of dangerous enemies; while the length and flexibility of its neck may have compensated for the want of strength in its jaws, and its incapacity for swift motion through the water, by the suddenness and agility of the attack which they enabled it to make on every animal fitted for its prey which came within its reach.' ('Geol. Trans.,' vol. i. part 2, p. 388, N.S.)

Geographical Distribution, &c. — Professor Owen concludes a Report, which leaves nothing to be wished, by remarking that with respect to the geological relations of the *Enaliosaurians*, or the extent of strata through which their relics have been traced, his researches are merely confirmatory of the generalisation already enunciated by Mr. Conybeare and Dr. Buckland. 'The British Enaliosaurs,' says Professor Owen, 'extend through the whole of the oolitic period, including the lias and oolite proper, to the wealden and chalk formations, the most recent depositary being the chalk marl, in which Ichthyosaurian remains have been discovered by Dr. Mantell, at Dover. Dr. Buckland has found similar remains in the gault near Benson, Oxon; and I have seen the humerus of a Plesiosaurus from the gault near Maidstone.'

PLESTIN. [Cotes-du-Nord.]

PLE'THORA (a Greek word, πλησθώρη, *plethóre, fulness*, in which sense it is used by the Greek medical writers) signifies a redundancy of blood. By the older writers the term was used to express an imagined superabundance of any of the fluids of the body; and the terms bilious, lymphatic, and milky plethora, &c., implied the existence of an excess of one or other of those fluids in the blood. By the majority of the physicians of the present day the term Plethora is used only to express that condition in which the quantity of blood and its nutritive qualities exceed that standard which is compatible with present health or the prospect of a continuance of health.

PLEURA is the membrane which envelopes the lungs and lines the cavities of the chest. On the walls of each cavity of the chest the Pleura Costalis (as it is here called) is formed by a sheet of fine and elastic cellular tissue, loosely attached to the ribs, intercostal muscles, and other subjacent parts. On the exterior of the lung the Pleura Pulmonalis is composed of a thin superficial layer of fine cellular tissue, a deeper layer of coarser fibrous tissue, which, in most of the large quadrupeds, and in the seal and some other animals, is very elastic, and affords an important assistance in the act of expiration. The surfaces of the two portions of pleura are continuous with each other at the root of the lung; each is covered with a delicate layer of epithelium; and they inclose within them a space called the Sac of the Pleura, into which a small quantity of serous fluid is constantly secreted, which moistens the opposite surfaces of the lung and of the wall of the chest, and permits their free motion upon each other.

PLEURISY (a word derived immediately from the French *Pleurésie* which comes from the Greek πλευρῖτις, and this again from πλευρὸν, *the side*) is an inflammation of the membrane which lines the ribs [Pleura], and is attended with difficulty of breathing, cough, fever, and pain shooting up towards the neck and shoulders. The disease has been variously divided by different writers according to the part of the pleura it attacks, and the intensity of the symptoms, but these distinctions are of little practical value.

Pleurisy terminates either in resolution, suppuration, or gangrene. The first is the ordinary and most favourable issue. The last occurs rarely, and Laennec has seen only one instance of it from acute inflammation. Suppuration however is by no means uncommon.

In the treatment of pleurisy the great remedies to be relied on are bleeding, general and local, mercury to the extent of salivation, and counter-irritants, as blisters, tartar emetic, and castor oil.

Chronic pleurisy differs from acute only in its duration. The treatment required is not so active, and counter-irritants may be regarded as the most valuable remedies.

PLEURODONTS. MM. Duméril and Bibron make their *Ignaniens Pleurodontes* the first subfamily of the *Iguanian Lizards*, or *Sauriens Eunotes*.

This tribe corresponds to that designated by Wagler under the names of *Pachyglossa platycormæ* and *Stenocormæ Pleurodontes*, and by Wiegmann under those of *Pachyglossæ Dendrobatæ* and *Humivagæ Prosphyodontes*.

The maxillary teeth of the species composing the Pleurodonts have their summit, or free and enamelled part, more or less trilobated. There are only some genera in which the teeth are dentilated on the edges; nearly all have the palate armed with teeth, disposed in one or two rows on each side. Sometimes the tympanic membrane is stretched on the level of the auditory conduit, whose edge is either simple or dentilated, and

sometimes it is a little sunk within it. None of the known species are without an external ear. Among these *Pleurodont Iguanians* alone are met with species whose toes are enlarged nearly in the same manner as in some of the *Geckoes*. All the *Pleurodont Iguanians*, with the exception of one genus only (*Brachylophus*), are natives of the New World.

PLEURODY'NIA called also 'false pleurisy.' The term includes all those pains of the side which are unconnected with pleuritic inflammation, whether arising from a rheumatic affection of the intercostal muscles, neuralgia in the same parts, or any other cause not evidently pleuritic.

PLEURONE'CTIDÆ, a family of fishes, of the order *Malacopterygii* and the section *Subbrachiales*. This family contains the Soles, Flounders, and Turbots, and some other fishes, all of which are readily distinguished by the flattened form of the body, and in having both the eyes on one side. This want of symmetry in the form of the head, Cuvier states, is unique amongst vertebrate animals. The side of the body which is uppermost is always coloured, and might be mistaken for the back of the fish, while the opposite side is white. The two sides of the mouth are unequal, and it is uncommon to find the two pectoral fins equal; the dorsal and anal fins extend the whole length of the back and abdomen respectively; the ventrals appear like a continuation of the anal; the branchiostegous membrane has six rays.

PLEURO'PTERA, the name of a tribe of quadrupeds generally known as Flying Lemurs (*Galeopithecus* of Pallas; Flying Cats and Flying Foxes of voyagers). They are generally arranged under the order *Carnassiers*, and some authors place them in the division *Cheiroptera;* but they differ from the Bats inasmuch as the toes of their anterior extremities, which are all furnished with sharp claws, are not more elongated than those of the hind feet, so that the membrane which occupies the interval between the extremities to the sides of the tail can hardly operate in executing more than the functions of a parachute.

They belong in fact to the *Lemuridæ*, representing in that family the Flying Squirrels. They are Lemurs furnished with parachutes. [LEMURIDÆ; SQUIRRELS.]

Galeopithecus Temminckii.

Cuvier and others state that the *Galeopitheci* live on trees in the islands of the Indian Archipelago, and there pursue insects, and perhaps birds, as their prey. Judging from the detrition of the teeth with age, he thinks that they must also feed on fruits. They have a very large cæcum. Mr. Waterhouse has determined the existence of two distinct species, viz. *Galeopithecus Temminckii*, and *Gal. Philippensis*.

PLEYL (commonly written *Pleyel*), IGNAZ, was born in 1757, at Rüpperstahl, near Vienna. He was initiated in Latin and music at a very early age. When sufficiently advanced in the latter, he had Vanhall for a master, and subsequently Haydn.

In 1787, Pleyl was appointed Maitre-de-Chapelle of Strasburg cathedral, and during the next ten years he produced nearly all those works which carried his name into every city in Europe. They are light, sometimes very trivial, but occasionally bold and vigorous. A few of his quartets and sonatas possess much beauty. In 1793 he visited London, but ultimately settled in Paris, where he died Nov. 14, 1831, after having made a large fortune as a music seller and piano-forte maker.

PLICA POLO'NICA is the name given to a disease which is chiefly remarkable for the sticking together and matting of the hair, and which is peculiarly frequent in Poland. A few examples of it have been met with in Tartary, among the lower orders of the Russians, and in Hungary, and fewer still in Switzerland and France.

The disease chiefly affects the scalp. The hair grows to an unusual length, is matted together by a sticky and most offensively-smelling secretion, and is commonly infested with vermin. The only treatment which is known to be constantly beneficial is the removal of the hair, and strict cleanliness. Other means must be adopted in each case, according to the general state of the patient's health.

PLICIPENNES, acording to Latreille, the third section into which the Neuropterous Insects are divided. The insects belonging to this section are well known to anglers by the name of Caddis-Fly, and in the larva state they are called Caddis-Worm or Cadew-Worm. They constitute the genus *Phryganea* of De Geer, and have been raised to the rank of an order by Messrs. Kirby and Spence and Dr. Leach, being the order *Trichoptera* of their systems.

The larva, or Caddis-Worm, always lives in the water, and incloses itself in a cylindrical case, open at both ends, and formed of pieces of stick, small shells, and various other substances, which the insect joins together by a silken web. It never quits this case; but when it wishes to move it protrudes the fore part of the body, which is furnished with six tolerably long legs, and crawls about with the case attached to the hinder part, it being held by means of two hooks situated on the last segment of the abdomen. The form of the larva is nearly cylindrical, but slightly compressed. The head and first three segments of the body (which in fact constitute the thorax) are coriaceous; the remaining segments are soft. When about to change into the pupa state, the larva fixes its tube

to some substance in the water, and closes the ends. The transformation is what is termed complete, the pupa resembling the perfect insect, except in having the wings imperfectly developed, and also in having two hooks on the fore part of the head, by means of which it makes its escape from the case, that it may swim to some dry situation when about to assume the perfect state.

PLINTH, the square stone which forms the foundation of a column in some of the orders of architecture.

PLINY THE ELDER. (*Caius Plinius Secundus* was born, as is commonly supposed, A.D. 23. The place of his birth is very uncertain, but it is supposed that it was Comum, in North Italy. He was of a noble family, served in the army, was an augur, and afterwards procurator of Spain. But he was all through life a hard student, a multifarious reader, and a most laborious compiler. He was abstemious in all things, an exact man of business, one who made labour his pleasure. The circumstances of his death form a curious chapter in the life of a literary man, and they are told minutely and well by his nephew in a letter to the historian Tacitus (Plin. 'Ep.' vi. 16). He was at Misenum in the Gulf of Naples, with a fleet under his command, with his sister and her son, the writer of the letter above mentioned. On the 24th of August, A.D. 79, there was an eruption of Vesuvius, and Pliny went in a ship from Misenum to the coast nearer the mountain, and thence to Stabiæ, with a view to help the people who were threatened with destruction by the ashes and stones which the mountain vomited forth, and also to have a better view of this great phenomenon. While he was at Stabiæ the eruption increased in violence, the ground shook with an earthquake, and he and his friends sought their safety by leaving the house. They made for the open country in the midst of thick darkness and showers of ashes. Pliny fell down suffocated, as seems most probable, by the sulphureous vapour.

The titles of several of his works are given by his nephew ('Epist.,' iii. 5); of these the only one that is still extant is his 'Natural History,' which may well be called 'a work of great compass and erudition, and as varied as nature herself.' To give anything like a complete critical analysis of this work would require the immense and multifarious learning of Pliny himself, and a thorough knowledge not only of all that the ancients have written on the same subjects, but also of all the improvements and discoveries of modern times. Accordingly in the French translation, published a few years ago, the assistance of a number of scientific men was secured, each of whom laboured to illustrate Pliny's opinions on his own particular branch of knowledge. The work consists of thirty-seven books, all of which are still extant, though the text is in many places in a very corrupt state, and several passages are quite lost. The first book is a table of the contents of the other thirty-six; the second treats of the world, the elements, the stars, the winds, &c.; the third, fourth, fifth, and sixth contain a geographical account of the whole of the then known world; the seventh treats of the generation and organisation of man, the most remarkable characters that have ever lived, and the most useful inventions; the eighth, ninth, tenth, and eleventh contain a system of zoology, and treat of beasts, fishes, birds, and insects, and of human and comparative anatomy; sixteen books, from the twelfth to the twenty-seventh, are given up to botany, and give an account of trees, herbs, fruit, corn, &c., and the medicines which they furnish; five books, from the twenty-eighth to the thirty-second, treat of medicines derived from different animals; the thirty-third and thirty-fourth, of different kinds of metals, &c.; the thirty-fifth, of colours and painting; the thirty-sixth of stones and sculpture; and the thirty-seventh of different kinds of gems, &c.

This will give some idea of the miscellaneous nature of the contents of this extraordinary work, and if the judgment of the writer had been equal to his industry and learning, it might well have been considered as one of the greatest monuments of human ability. The work of Pliny is an immense collection of facts, not facts observed, but facts, or supposed facts, which he found recorded. He selects his facts with little discrimination, nor does he combine them into any system. He has not always correctly represented the meaning of the authors from whom he has taken his facts; and his work is of little value for modern science. The part which treats of geography is brief and confused, and yet it contains much valuable information; and what he has said of painting, sculpture, and the arts generally, is valuable both for the history of art and its practical details.

The first edition of Pliny was published at Venice, 1469, fol., by Joannes de Spira. Those most worth mentioning for their critical excellence are, that by Hardouin, Paris, 1685, 4to., 5 vols., of which a second and improved edition was published, Paris, 1723, fol., 3 vols.; that by Franzius, 8vo., 10 vols., Lips., 1778–1791; and that published by Panckoucke, Paris, 8vo., 20 vols., 1829–33, with a new French translation by Ajasson de Grandsagne, and copious notes by many of the most eminent scientific men of France. The edition by Sillig, Lips., 1831–36, 12mo., 5 vols., contains the Various Readings of a MS. at Bamberg, which had never before been collated. Pliny's work has been translated into many languages. There is an English translation by Holland, 1601, London, 2 vols. fol.

PLINY THE YOUNGER. *Caius Plinius Cæcilius Secundus* was born at Comum, A.D. 61 or 62. His father, Caius Cæcilius, who was of an equestrian family, died young, and the son was adopted by Pliny the Elder, who was his mother's brother. Pliny was a forward youth; he wrote a Greek tragedy when he was only fourteen. At the age of nineteen he practised in the court of the Centúmviri, and he afterwards appeared as an advocate in causes tried before the senate. He also served in the army. In A.D. 103 he was appointed by Trajan proconsul of Bithynia. Pliny was a friend of the historian Tacitus. He was a man of mild and generous disposition, rich and munificent. He was twice married, but left no children. The time of his death is not known.

Of his numerous works, his 'Epistles' in ten books, and his 'Panegyric on Trajan' are all that remain. The first nine books of the Epistles are addressed to various persons; the tenth contains the letters to Trajan and the Emperor's answers. The collection is instructive and amusing, though it has one defect—many of the letters were written with a view to publication. This man, who was kind to his slaves, was severe to the Christians, much severer than Trajan, whose remarks on the case of the Christians of Bithynia were in favour of a milder treatment than his governor recommended and practised. The chief facts of Pliny's life are collected from his own Epistles. There are numerous editions of the Epistles and Panegyric; one of the most recent and convenient is that by G. H. Schäfer, Leipzig, 8vo., 1805. There is an English translation of them by Lord Orrery, and also by Melmoth.

PLOCK. [POLAND.]

PLOCK, the capital of the Russian government of the same name, is situated on the Vistula. It has about 8000 inhabitants, of whom 3000 are Jews. Plock gives a title to a Roman Catholic bishop, who resides at Pultusk. There are in the town 11 churches, 5 convents, an episcopal palace, a Piarist gymnasium, a seminary of secular priests, an orphan house, a lunatic asylum, a literary society, &c. The inhabitants subsist partly by agriculture and partly by a brisk trade with Danzig and other places.

PLOERMEL. [MORBIHAN.]

PLOMBGOMME—*Hydrated Aluminate of Lead.* This mineral is in small globular and reniform masses, composed of many thin concentric layers; it is brownish-yellow, and translucent. Specific gravity, 6.425.

PLOOS VAN AMSTEL, CORNELIS, born at Amsterdam, in 1726, is chiefly distinguished for his imitations of the drawings of old masters, of which he possessed one of the best collections known, amounting to 5000 drawings by celebrated Italian, German, French, Flemish, and Dutch masters, from Giotto to his own time. In 1765 he published a collection of forty-six such imitations in various styles. A collection of one hundred of his own and some additional similar imitations, was published by C. Josi, in London, in 1821, royal folio; but only one hundred copies were printed, and at the enormous price of forty guineas per copy. Ploos van Amstel died at Amsterdam, Dec. 20, 1798, and on March 3, 1800, his valuable collection of prints, etchings, &c., with the exception of the etchings of Rembrandt, was sold by auction, and realised the large sum of 109,406 florins.

PLOT, ROBERT, LL.D. (born 1641, died 1696), had his early education in the school at Wye, in Kent, from which he went to Magdalene Hall, Oxford. He took his master's degree in arts and both his degrees in law, and then removed to University College. In 1677 he published a 'Natural History of Oxfordshire.' In 1682 he was elected one of the secretaries of the Royal Society, and in the succeeding year was appointed by Ashmole the keeper of the museum which he had founded at Oxford. About this time also he was chosen professor of chemistry in that university. In 1685 he published a tract on the origin of springs, and in 1686 a 'Natural History of Staffordshire.'

Having attracted the attention of the Duke of Norfolk, he was appointed his secretary, and in 1688 was made by King James II., historiographer royal. He died at Sutton-Barne, Kent, at the age of 55.

PLOTI'NUS, the most celebrated writer and teacher of the Neo-Platonic school at Alexandria, was born at Lycópolis in Egypt, A.D. 204. He studied at Alexandria, and more particularly under Ammonius, the founder of the Eclectic School. Plotinus joined the army of Gordian, A.D. 248, when the Emperor was marching against the Parthians; and on the death of the Emperor he went to Antioch and thence to Rome, where he taught for many years. In his fiftieth year, at the request of Porphyrius, the most famous of his disciples, he committed his lectures to writing. He died A.D. 274, in Campania. The work of Plotinus consists of fifty-four books, which Porphyrius distributed into six Enneads or sets of nine books. Plotinus treated of the most obscure subjects, such as 'On the Essence of the Soul,' 'On the Unity of the Good,' and so forth. An edition of the works of Plotinus, in 3 vols. 4to., by F. Creuzer, was printed at the Oxford University Press in 1835. There is an English translation, 'Select Works of Plotinus,' by T. Taylor.

PLOUGH. That the plough is an instrument of the highest antiquity is apparent, both from the oldest writings that we possess and from the existing monuments of Egypt. The oldest forms of the plough of which we have any description in ancient authors, or which are represented on monuments or coins, are very simple: a mere wedge, with a crooked handle to guide it, and a short beam by which it was drawn, form the whole instrument. The light Hindoo plough, now in use in many parts of India, seems to differ little from the old model.

The different essential parts of a plough have certain names usually given to them. The *Body* of a plough is that part to which all the other parts are attached. The bottom of it is called the *Sole* or *Slade*, to the fore part of which is affixed the *Point*, or *Share*; the hind part of the sole is called the *Heel*. The *Beam*, which advances forward from the body, serves to keep the plough in its proper direction, and to the end of it are attached the oxen or horses, which are employed to draw it. Fixed in the beam, in a vertical position, before the point of the share, with its point a little forward, is the *Coulter*, which serves to cut a vertical section in the ground, while the point of the share, expanding into a *Fin*, separates a slice by a horizontal cut from the subsoil or solid ground under it. The *Mould-Board*, or *Turn-Furrow*, is placed obliquely behind the fin, to the right or left, in order to push aside and turn over the slice of earth which the coulter and share have cut off: it thus leaves a regular furrow wherever the plough has passed, which furrow is intended to be filled up by the slice cut off from the land by the side of it, when the plough re-

turns. The *Stilts*, or handles, of which there may be either one or two, as is thought more convenient, direct the plough by keeping it in the line required and at a regular depth in the ground. The single stilt appears to be the most ancient form.

Wheels are a modern invention in comparison with the other parts. They support the end of the beam, and prevent it from going too deep into the ground or rising out of it while the plough is going on. The greatest improvements introduced into modern ploughs are in the shape of the mould-board, or turn-furrow, and the contrivances for regulating the line of draught, so as to make the plough go at an equal depth, and cut off a regular slice of equal breadth, without any great force being applied by the ploughman who holds the stilts.

The mould-board of a plough is either fixed on one side, or made so as to be shifted from one side to the other. In the first case half the furrow-slices lie on one side and half on the other, and there is of necessity a double furrow where they join. When it is desirable that the surface should be quite flat, and the furrow-slices all in one direction, the mould-board must be shifted at every turn, and a plough which admits of this is called a Turn-Wrest Plough.

It is evident that the mould-board of a turn-wrest plough must be so constructed as to act with either side uppermost; it can therefore have only a very slight convexity to push over the slice cut off by the coulter and share; and a considerable force is lost by the obliquity of the action in doing so. The share of this plough is pointed like a lance, or presents a flat edge like a broad chisel, according as the soil is light or heavy. The defect of this plough is in its weight or clumsiness more than in the shape of the mould-board; for when it is made lighter, it is not so bad a construction as appears at first sight, and it does its work very neatly in heavy loams with a dry subsoil.

The form of the turn-furrow is of material importance, for on this depends not only the perfection of the work, but also the lightness of the draught. When we follow a plough working in a mellow soil which slightly adheres to the plough, we often perceive that, instead of being turned aside, the earth is carried forward, and only falls off when the accumulation of it becomes heavy enough to overcome the adhesion. It does not slide off from the mould-board itself, but separates from the earth which adheres to the latter; thus showing that the shape is defective, and giving good hints for its improvement. But as the same plough will sometimes turn over the same earth better when it is either drier or moister, it is very difficult to determine, by experiment only, what may, on the whole, be the best shape. The application of scientific principles has enabled several persons of late years to construct ploughs which are nearly as perfect as can be desired, and some of them have been in various districts brought into general use.

Ploughs were formerly made of wood, having those parts covered with iron where the greatest friction takes place, the share and coulter only being of iron; but in consequence of the greater facility of casting iron in modern times, most of the parts are now made of this metal. The beam and stilts are still usually of wood, but even these are now sometimes made of wrought iron. The advantages of iron are, its durability and the smaller friction it occasions when once polished by use. The inconveniences are the additional weight of the instrument, and consequent greater friction of the sole. Recent experiments have proved this to be greater than was generally suspected. A great improvement has been introduced by making the points of the shares of cast-iron, which, by a mode of casting the lower surface on a plate of metal, makes one surface much harder than the other; and as the softer surface wears more rapidly, a sharp edge is always preserved.

The different parts of a plough are now usually cast, so that if any one fails or wears out, it can be instantly replaced, by moving a few screws or bolts. This is a very great saving of time and expense; for before this, every time an accident happened to any part of the plough, it took a long time to repair it, and in the mean time the labour was suspended, often at a very critical time of the year. There is another advantage in having the essential parts of cast-iron. If any particular shape has been once discovered to be the best for any part, that shape is preserved without deviation in every plough made on the same pattern, and with respect to the turn-furrow this is of great importance.

The stilts of the plough are mostly of wood. Where the soil is light and crumbling, without stones, as in Norfolk, a single handle or stilt is sufficient; but where some force is occasionally required to prevent stones or other obstacles from turning the plough out of its course, two stilts are most convenient, placed at a more obtuse angle with the sole of the plough.

The force required to draw a plough depends not only on the nature of the soil, but also on the shape of the plough and especially on the position of its different parts with respect to each other, so that they do not counteract each other.

Without entering into any comparison of ploughs differently constructed, it is evident that the shape of the plough must vary with the nature of the soil which it is to turn up. A light soil must be shovelled up; a mellow one may be turned over with any kind of mould-board; a very stiff tenacious soil which adheres to any surface pressed against it, will be more easily turned over by a few points of contact which do not allow of adhesion. Hence the point and turn-furrow have been made of all imaginable shapes, and while one man contends for a very concave form, another will admit of nothing which is not very convex. That plough will no doubt have the least draught which is best suited to the soil which it has to move. The lighter the plough is, consistently with sufficient strength, the less draught it requires, all other circumstances remaining the same. Lightness and strength combined are consequently great advantages, and

if a very light plough does its work as well as a heavier, there can be no doubt that it is preferable. Durability is nothing compared with the saving of one horse in three: it is cheaper to have a new plough every year than to keep an additional horse all the year. If a wooden plough is found to be more easily moved than an iron one, there can be no doubt which should be preferred.

In ploughing land which is more or less mellow and crumbling, the great object is to bring to the surface that portion which has lain buried, and has not served to nourish the preceding crop, and to bury that which has produced vegetation, and in which the roots of various weeds have established themselves. When manure is to be covered with a certain depth of earth, a more complete subversion is required, in order that no part of it may remain uncovered. When the land is in a compact state, from the roots which pervade it, and it is only ploughed once to prepare it for receiving the seed, much greater nicety is required to lay the slices at a certain angle so as to leave regular lines or depressions in which the seed may fall and be readily covered by the harrows which follow. In this case the angle of 45° is found to be the most convenient at which the furrow-slices may be laid against one another.

When the seed is to be dibbled on the sward which is reversed by a single ploughing, it is necessary that the sod should be completely turned over and laid flat. To do this, and at the same time to bury all the grass, requires the furrows to be very equal and parallel; so that when a roller has gone over the land, it is perfectly flat, without any interstices between the slices which are turned over. It requires a good ploughman to do this perfectly.

When clover-ley or old grass is ploughed up, it is difficult to bury all the grass which grows on the edge of the slice; and if it remains exposed, it will grow and increase to the detriment of the corn. To prevent this, a wing is sometimes added to the side of the coulter, a few inches from the point. It cuts a small horizontal slice off the surface before the sod is turned over, and this falls into the bottom of the furrow and is buried there. The coulter with such a wing is called a *Skim Coulter*, because it, as it were, skims the surface. This instrument may require an additional horse to be put to the plough in tenacious soils, but this cannot be avoided. There is no doubt that no more horses should be put to a plough than can do the work; but whatever be the number required, the work must be done well. There is no saving in doing the work imperfectly. The discussions about the number of horses which should draw a plough might easily be settled, if the nature of the soil were sufficiently taken into consideration. The shape of the plough may make some difference, but the tenacity of the soil makes a much greater. It is however not a little surprising that there should be so little variety in the width of the furrows. It would appear as if there were a law prohibiting furrows less than eight inches wide, or more than ten: a furrow-slice five inches wide and ten deep requires no more power than one ten inches wide and five deep. It is true that a plough will not do more than half an acre at most in a day with narrow furrows; but if two horses will do this, and two ploughs instead of one be used, with one man and two horses each, an acre will be ploughed in a day with four horses and two men, which is the number usually employed, when the furrows are deep and nine or ten inches wide; but the land will be much better stirred, and laid more even. The plough need not be narrower for this work; for if the first furrow be made wide enough, the plough can deepen it by a second turn in it, and a trench is formed in which the next slice falls, and is pushed aside by the tail of the turn-furrows, so as to leave another trench open ten inches wide.

Very little attention was formerly paid to the straightness of the furrows; but it is evident that every deviation from parallelism causes a defect in the contact of the slices, and a loss of force by the obliquity of the draught. A superficial observer would not perceive this, but minute examination proves it. Hence equal and straight furrows are a sign of good ploughing.

When the land lies on a dry subsoil, and no more moisture remains in it, after continued rains, than is useful to promote vegetation, it may be ploughed quite flat. This may be done by a plough with a movable turn-furrow, or by ploughing in a continued spiral from the centre to the circumference, or the reverse. In this case straight furrows cannot be made. The best way is to draw a furrow the whole length of the field in the middle, and plough towards this from both sides. If the field is wide, it is most convenient to plough it into several broad stitches, each a certain number of perches in breadth. A perch (16½ *feet*) is a very common width for a Stitch, and convenient to guide the sower or the drilling-machine.

But on moist impervious subsoils, it is necessary to lay the land in a rounded form, in order to let the superfluous water run off into furrows, from which it is conducted by proper channels into the ditches. In this case half a perch is a common width for each stitch, or Land, as it is sometimes called. It requires some practice to lay up a land in a rounded form from a flat surface.

One of the most useful operations in ploughing land is to cross the former furrows, by which means the whole soil is much more completely stirred; and if any part has been left solid without being moved by the plough-share, which is called a Balk, it is now necessarily moved. The leaving of balks is a great fault, and is owing to the sole of the plough being narrower than the furrow-slice, and the wing of the point too short, or to the ploughman not holding his plough upright. The share should cut the ground to the whole width of the furrow, so that no roots of thistles, docks, or other large weeds may escape and grow up again.

There are various modes of ploughing land when it is intended to pulverise and expose it to the sun in summer, or the frost in winter, to purify and fertilise it. To expose as great a surface as possible, the whole field is laid in high and narrow ridges, bringing to the surface all the

fertile portion of the soil, and often also a portion of the subsoil, so as to deepen the productive portion and give more room for the roots to spread in. The simplest method of increasing the surface exposed, when the land is first broken up from pasture, or after having been some years in grass, and is in a foul state, is called Ribbing. The plough turns up a slice, which it lays over flat on the adjoining surface. It does not cover this with the next slice, as if it were beginning the crown of a stitch, but it takes another slice at some distance, and then one parallel to the first, likewise laid flat on the solid part. When the whole field has been so ploughed, the surface consists altogether of ridges and furrows; but only half the surface has been ploughed. No grass appears; if it has been well done, the unploughed strips being covered by the slices raised by the sides of them, the two surfaces with grass on them cover each other. It is left in this state till the grass is rotten, and when the sod is broken to pieces by heavy drag-harrows, the land can be cross-ploughed and cleaned or fallowed in dry weather.

There is another mode of ridging, when the land has had one or two ploughings, in order to expose it to the frost in winter, and to mellow it. The operation is somewhat similar to ribbing, but after the first slice is turned over, another is added, as deep as the plough can be made to go so as not to bring up the subsoil; by this means the whole surface is laid in high ridges and deep furrows; and when this ploughing is reversed in spring, the soil which has been exposed to the frost and wind is mixed with the rest, and tends greatly to mellow it. This is an excellent preparation for turnips, if the land has been well cleaned.

In order to save hands and expedite the tillage of the land, ploughs have been contrived which make two or more furrows at once. When they are well-constructed, they are very useful on light soils. If it is not required to go deep, and two horses can draw a double plough, there is a decided saving of power; but if it requires four horses, nothing is gained. The double ploughs are therefore not much in use.

Deep ploughing is generally acknowledged to accord with the best husbandry, where the subsoil is dry naturally, or has been artificially drained; but some inconvenience may arise from bringing a barren subsoil to the surface, in trench-ploughing by two ploughs following each other in the same furrow. It has therefore been suggested to take off the turn-furrow from the plough which follows the first, so as to stir the subsoil without bringing it to the surface. This idea has been improved upon by constructing a subsoil-plough of great strength, which will go very deep into the ground and stir the subsoil a foot or more below the bottom of the usual furrow.

The instruments which have been invented to save the time and labour required by repeated ploughings are very numerous. New ones are daily invented, and some are supported by wheels, which render them both lighter and more convenient.

One of the most important of these instruments is the *Cultivator*, or *Scarifier*, which enters only a few inches into the ground, and moves a great surface by means of tines, or iron teeth, of various forms. It divides the soil, but does not turn it over, and is well calculated to destroy roots and weeds, and let in the air, but is only adapted to loose and mellow soils, where there are no large stones.

The common *Harrow*, which is drawn over the land when the seed has been sown after the last ploughing, is a frame set full of spikes, too well known to need description. The *Bush-Harrow*, which is drawn over the ground after the seed has been set by the dibble, is without spikes, and has thorns or rough bushes fixed in it. [ARABLE LAND.]

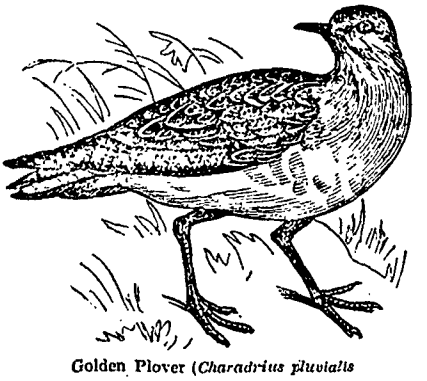
PLOVERS, *Charádriadæ*, a family of birds placed by Mr. Vigors in the order *Grallatores*, or *Waders*. The genus *Charadrius*, including the true Plovers, the Dottrell, the Sea-Lark, the Sanderling, the Stone-Curlew (*Œdicnemus*), the Long-Legged Plover (*Himantopus*), and the Spur-Winged Plover (*Charadrius spinosus*), was placed by Linnæus, in his 'Systema Naturæ,' between the genera *Tringa* and *Recurvirostra*, in his order *Grallæ*.

Cuvier makes the family of Plovers (*Les Pluviers*), comprising those genera which want the hind-toe, and have a moderate bill compressed and convex at the end, consist of two genera, *Œdicnemus*, and the Plovers properly so called (*Charadrius*, Linn.).

As British examples we may mention the Golden Plover (*Charadrius pluvialis*), the Dottrell (*Charadrius morinellus*), the Gray Plover (*Squatarola cinerea*), the Lapwing, or Peewit (*Vanellus cristatus*), the Long-Legged Plover (*Himantopus melanopterus*), the Pratincole (*Glareola*), the Sea-Pie (*Hæmatopus*), and the Turnstone (*Strepsilas*).

Mr. Selby gives a very correct and interesting account of the habits of the Golden Plover in this country:—'About the end of May or beginning of June, the females begin to lay, making but little artificial nest, a small depression in the ground amidst the heath being generally taken advantage of, and lined with a few dry fibres and stems of grass. The eggs are four in number. The young, when excluded, are covered with a beautiful particoloured down of bright king's yellow and brown; they quit the nest as soon as hatched, and follow their parents till able to fly and support themselves, which is in the course of a month or five weeks. The old birds display great anxiety in protecting their young brood, using various stratagems to divert the attention of an enemy; among others, that of tumbling over, as if unable to fly, or feigning lameness, is most frequent, and appears indeed to be the instinctive resort of those birds that construct the nest and rear their young on the ground. When aware of an intruder near, the female invariably runs to some distance from her nest before she takes wing, a manœuvre tending to conceal its true situation; and the discovery of it is rendered still more difficult by the colour and markings of the eggs assimilating closely to that of the ground and

surrounding herbage. The usual call-note of the Plover is a plaintive monotonous whistle, by imitating which it may frequently be enticed within a very short distance. In the breeding season a more varied call is used, during which it flies at a great elevation, and continues soaring round for a considerable time. Towards the end of August these birds begin to leave the moors (having there congregated in large flocks), and descend to the fallows and the newly-sown wheat-fields, where an abundance of their favourite food can be readily obtained. At this season they soon become very fat, and are excellent at the table, their flesh being not inferior in flavour to that of the Woodcock or any of our most esteemed sorts of game. In these haunts they continue till severe weather approaches, when they either move nearer to the coast or migrate to the southern parts of the kingdom. They fly with strength and swiftness, and if disturbed, when in large flocks, generally perform many aerial evolutions and rapid wheelings before they again settle on the ground. The Golden Plover is a nocturnal feeder, and, during the day, is commonly seen squatted upon the ground or standing asleep, with the head drawn down between the shoulders. Its food consists of earth-worms, slugs, insects, and their larvæ, particularly those of the Lepidopterous tribe, many rare species of which I have, upon dissection, found in their stomachs and gullet during the summer season. It runs very fast, and, when wounded, is difficult to be caught without the aid of a dog.'



Golden Plover (*Charadrius pluvialis*

(Selby's *Illustrations of British Birds;* Yarrell's *British Birds;* Gould's *Birds of Europe;* Vigors in *Linn. Trans.*, vol. xv.; Swainson's *Classification of Birds;* and Mr. G. R. Gray's *Arrangement.*)

PLOWDEN, EDMUND, Serjeant-at-Law, an eminent lawyer in the reign of Mary and the early part of that of Elizabeth, was born about the year 1517. He was twice a reader of the Middle Temple. He died in 1584 and was buried in the Temple church. Plowden is the author of Reports, or Commentaries, which are a collection of reports of important cases, extending from the reign of Edward VI. to the middle of the reign of Elizabeth. The first complete edition of Plowden's 'Commentaries' is in black letter and Norman French, fol., 1684. The second edition is translated into English, fol., 1761.

PLUM. The *Prunus domestica* is generally considered as the species which has given rise to the numerous varieties of this fruit; but both *Prunus insititia* and *P. spinosa* have most probably contributed. These species are indigenous to a great portion of the northern hemisphere, Britain included. Damascus was formerly celebrated for this fruit. In this country the name of *Damascene* was given to those varieties which may be supposed to have been brought from Damascus, or to others similar; but the corruption of this to *Damson* has been long established.

The cultivation of the plum is not difficult. The tree is hardier than the cherry tree, at least than that producing the Bigarreau and Heart-cherries; but the blossoms are equally tender. The winter at Riga does not kill the plum tree, but the cherry trees just mentioned and many varieties of the pear-tree and apple-tree are killed there.

PLUMBA'GIN, a vegetable principle existing in the root of the *Plumbago Europæa.* The substance is of a lemon-yellow colour, and has a sweetish taste, but leaves an acrid hot impression in the mouth. It melts in a gentle heat, and assumes a crystalline appearance on cooling.

PLUMBAGINA'CEÆ are a small natural order of Monopetalous Exogens. The principal genus of the order is the *Statice,* whose many species, under the name of Sea Lavenders, inhabit the salt-marshes or sea-cliffs of all the temperate parts of Europe. The prevailing colour of the flowers is blue, instances of yellow, or any other colour than blue, being rare. Garden Thrift, *Armeria vulgaris,* is a plant frequently used for ornamental borders in flower-gardens.

PLUMBA'GO—*Graphite, Black Lead.* This substance occurs crystallized and massive. Primary form a rhomboid. Hardness 1.0 to 2.0. Specific gravity 2.08 to 2.45. Massive varieties occur amorphous, in reniform masses, and irregular nodules.

Found in various parts of the world. That of Borrowdale in Cumberland is of the best quality for what are called black-lead pencils; while the commoner sorts are used for making melting-pots, for diminishing the friction of machinery, and for protecting iron from rusting. That which is imported from the East Indies is remarkably soft. Plumbago conducts electricity, is infusible, and very difficult of combustion.

Professor Vanuxem has analysed several varieties of plumbago. The following is the analysis of a pure specimen from Borrowdale:—

Carbon	88.37
Silica	5.10
Alumina	1.00
Water	1.23
Oxides of iron and manganese	3.6
	99.30

It was at one time supposed that plumbago was a carburet of iron, but, in the opinion of Berzelius, the experiments of Karsten have proved that it is

a peculiar form of carbon, and that the substances which it contains are in a state of mixture merely and not of chemical combination.

According to Dr. Thomson, plumbago is found usually in primary or transition rocks. At Borrowdale it occurs in nests in a greenstone rock, which constitutes a bed in clay-slate. In Inverness-shire it occurs in gneiss; at Arendal in Norway, in quartz rock; and in the United States, in felspar and mica-slate, but always in primary rocks.

PLUMBLINE. When a heavy body suspended by a flexible string is at rest, the line passing through the point of suspension and the centre of gravity of the weight, is in the direction in which gravity acts. The *Horizon* is a plane perpendicular to this line, and the *Zenith* is that point of the heavens marked out by the continuation of the line upwards. If the string be perfectly flexible, it will coincide with the theoretical line above described.

The plumbline is used in the arts. In levelling and in astronomical instruments, it has in most cases been superseded by the spirit level or observation by reflexion.

PLURALITIES. [BENEFICE.]

PLUTARCHUS was a native of Chæronea in Bœotia. He was studying philosophy under Ammonius at Delphi at the time when Nero was making his progress through Greece, which was in the twelfth year of the emperor's reign, or A.D. 66. The family of Plutarch was one of some consideration in Chæronea, and had held the chief offices in that city. Few facts about his life are known. He visited Italy and Rome, perhaps more than once ('Life of Demosthenes,' c. 2); and yet it appears, from his own statement, that he did not acquire a knowledge of Latin in Italy; and it was not till a late period in life that he began to read Latin authors. He gave lectures on philosophy during his residence in Rome, and of course in the Greek language. He was intimate with some of his principal contemporaries at Rome, and among them was Sossius Senecio, who was also a friend of the younger Pliny. Plutarch returned to Chæronea in his old age, where he discharged several magisterial offices, and he had also the emoluments of a priesthood. Plutarch had a wife Timóxena, and four sons and a daughter. It was on the occasion of his daughter's death that he wrote that affectionate letter of consolation to his wife which is among his extant works. The time of Plutarch's death is unknown.

The great work of Plutarch is his 'Parallel Lives', which consists of the biography of forty-six distinguished Greeks and Romans, besides the lives of Artaxerxes Mnemon, Aratus, Galba, Othó, and Homer. The forty-six Lives are arranged in pairs or sets, each of which contains a Greek and Roman; and the two lives of each pair are followed by a comparison of the characters of the two persons, except in a few cases where the comparison was not written or has been lost. The biographies of Epaminondas and some others are lost. Plutarch's biographies are written upon a plan which he has explained himself in the Introduction to the 'Life of Alexander the Great:' they are not Histories, he says, but Lives, and the object is the exhibition of character. Accordingly they are sometimes deficient in precision, and the author frequently pays little regard to chronological arrangement. He was also sometimes rather careless about his facts, and his critical judgment was occasionally defective; but whatever defects his Lives may have, they record many facts which would otherwise have been unknown; and they have always been a favourite book with all classes of readers, and with some men whose favourable judgment is the highest praise. Montaigne and Rousseau were both great readers and admirers of Plutarch's Lives.

Besides the Lives, a considerable number of Plutarch's Essays may be styled historical. They may all be read with pleasure and some of them with instruction, not so much for their historical value as for the detached curious facts that are scattered so profusely through Plutarch's writings, and for the picture which they exhibit of the author's own mind. In one of these essays, entitled 'On the Malignity of Herodotus' he has, unfortunately for his own reputation, attacked the veracity and integrity of the father of history. The 'Lives of the Ten Orators,' which are attributed to Plutarch, are of little value, and may not be his; still they bear internal evidence, at least negatively, of not being of a later age than that of Plutarch.

The Lives of Plutarch first appeared in a Latin version by several hands at Rome, in 2 vols. folio, about 1470. This Latin version formed the basis of various Spanish and Italian translations. The first edition of the Greek text was printed by P. Giunta, Florence, 1517, folio. The last and best edition of the Greek text is by C. Sintenis, Leipzig, 4 vols. 8vo. There is a good German translation by Kaltwasser, Magdeburg, 1799–1806, 10 vols. 8vo., the last of which contains a copious index. The French translation by Amyot has great merit. The English translation by Thomas North, London, 1612, is avowedly made from that of Amyot, but it sometimes differs materially from the French version. There is a French translation of the Lives, by Dacier, Paris, 8 vols. 4to., 1721. The translation sometimes called Dryden's was executed by many writers. Dryden translated nothing: he merely wrote the Life of Plutarch, and the dedication to the Duke of Ormond. The English translation of John and William Langhorne is often loose, and in bad taste; nor is it much improved by Wrangham's revision and notes. There is an English translation of Roman Lives, including the Lives of Tiberius and Caius Gracchus, and the rest of the intermediate Roman Lives to that of M. Antonius, thirteen in all, with notes, by George Long.

The other writings of Plutarch, which consist of about sixty essays, are generally comprehended under the title of his 'Moralia,' or Ethical Works, many of them being entirely of an ethical character. The minor historical pieces already referred to, of which that on the Malignity of Herodotus is one, are usually comprised in the collection entitled 'Moralia.' Plutarch was fond of the writings of

Plato; he was strongly opposed to the Epicureans. If he belonged to any philosophical sect, it was that of the Academics. There is nothing like a system of philosophy in his writings. But a moral end is always apparent in his 'Moralia' as well as in his Biographies. A kind humane disposition, and a love of everything that is ennobling and excellent, pervade his writings, and give the reader the same kind of pleasure that he has in the company of an esteemed friend, whose singleness of heart appears in everything that he says or does. Plutarch rightly appreciated the importance of education, and he gives many good precepts for the bringing up of children. His philosophy was practical, and in many of its applications, as for instance his 'Letter of Consolation to Apollonius,' and his 'Marriage Precepts,' he is as felicitous in expression as he is sound in his precepts. Notwithstanding all the deductions that the most fastidious critic may make from Plutarch's moral writings, it cannot be denied that there is something in them which always pleases, and the more the better we become acquainted with them; and this is no small merit in a writer.

The first Greek edition of the 'Moralia,' which is exceedingly incorrect, was printed by the elder Aldus, with the following title, 'Plutarchi Opuscula, lxxxxii.,' Gr., Venetiis, 1509, folio. The only good edition of the 'Moralia' is that printed at Oxford, and edited by D. Wyttenbach, who laboured on it twenty-four years. This edition consists of six volumes of text (1795–1800), and two volumes of notes (1810–1821), 4to. The remarks of Wyttenbach were printed at Leipzig, in 1821, in two vols. 8vo.

The first edition of all the works of Plutarch is by H. Stephens, Geneva, 1572, 13 vols. 8vo, which is said to be correctly printed. This edition was reprinted several times. A complete edition, Greek and Latin, appeared at Leipzig, 1774–1782, 12 vols. 8vo., with the name of J. J. Reiske, but Reiske did very little to it, for he died in 1774. An edition by J. C. Hutten, appeared at Tübingen, 1791–1805, 14 vols. 8vo.

The 'Moralia' have been translated into French by Amyot. Amyot's complete translation of all the works was reprinted at Paris by Didot, 1818–1820, 25 vols. 8vo. The 'Moralia' have been translated into German by Kaltwasser. There is an English translation by Philemon Holland, London, 1603, folio.

PLUTO, more frequently called by the Greeks Hades (*Ἅιδης*), and by the Romans *Orcus* and *Dis*, was the brother of Zeus and Poseidon, and the deity that presided over the region beneath the earth, where the departed souls of men were placed. Hades, which is also written without an aspirate, Ades, is a word of uncertain etymology. Pluto is represented by the ancient writers as a gloomy deity, inexorable to the prayers of mortals, and hated by the human race above all the gods. ('Iliad,' ix. 159.) His wife was Persephone, called by the Romans Prosérpina. In later writers the word Hades also signifies the abode of the dead, as well as the deity who presided over it.

PLUTONIC. Rocks of igneous origin and ancient geological date are thus designated in many modern works. In publications relating to the controversy between Wernerians and Huttonians, the former are often styled Neptunists, the latter Plutonists. In Brongniart's 'Tableau des Terrains,' these rocks are separated from volcanic rocks, on the hypothesis that the latter are specially rocks of fusion. Granite, syenite, and porphyry, are Plutonic rocks.

PLUTUS, the god of wealth, is said by Hesiod ('Theog.,' 969) to have been the son of Deméter and the hero Jasius. He appears as a character in the comedy of Aristophanes named after him; but we have no particulars respecting his worship.

PLYMOUTH, a seaport, market-town, parliamentary borough, and municipal borough, in Devonshire, in 50° 17′ N. lat., and 4° 8′ W. long., is 192 miles in a direct line W.S.W. from London, and 246¾ miles by the Great Western Railway through Bristol and Exeter.

The town is situated on the north side of Plymouth Sound, between the two great arms of that harbour, Catwater on the east, and Hamoaze on the west, but at some distance from both. The small inlet of Sutton Pool is close to the town on the east side, and Mill Bay, another inlet, not far from it on the west. On the point at the entrance to Sutton Pool is the citadel, and to the north of this lies the town, consisting of a number of streets, of which the older are irregularly laid out, while those of modern date are on a more regular plan. During the present century, the town, which is well lighted with gas, has been considerably improved.

St. Andrew's Church is a spacious structure of ancient foundation and varied architecture, having a square embattled tower. Charles Church, which was begun just before the civil war of Charles I., but not completed until after the Restoration, is a neat building, with a square tower and well-proportioned spire. There are two chapels-of-ease, and several chapels for dissenters. The town also contains an assembly-room, a theatre, a custom-house, baths, an hospital, the Athenæum, a public library, Freemasons' Hall, and Mechanics' Institute. The Guildhall is an irregular structure, comprehending the central police-station and the town prison. The grammar-school is a substantial stone building.

The harbour of Plymouth comprehends the Sound and its various arms. About 14 miles south stands the Eddystone Lighthouse, built by Smeaton in 1759, on a reef of rocks stretching north and south 100 fathoms, and forming a slope to the south-west. The tower is built of Portland stone and moorstone. It is 19 feet 9 inches in diameter at the top of the solid masonry, and about 26 feet 9 inches at its base, taken at the highest part of the rock on which it stands. The Sound is a considerable inlet of the English Channel, three miles wide at the entrance from Penlee Point on the west to the opposite headland on the east, and extending inland about three miles to the citadel and town of Plymouth. The dockyard [DEVONPORT] is on Hamoaze, which is the harbour for the ships of war, that of Catwater being used chiefly by merchant vessels. A break-

water or dyke, formed of loose stones, commenced in 1812, runs across the middle of the Sound, having a total length of 1700 yards, or nearly a mile. Its efficiency as a protection to the harbour has been proved in several severe gales. The harbour is defended from hostile attack by the citadel, by the fortifications on the island of St. Nicholas (which rises from the water not far from the northern shore of the Sound), and by various other batteries.

The trade of the place is very important. Besides the business arising from the dockyard at Devonport and the connected establishments, considerable trade is carried on with the West Indies, the Baltic, and the Mediterranean, and coastwise with London and other places; and there is an active fishery, especially of whiting and hake. The imports are timber and West India produce; the exports, manganese to Scotland, wool to Hull, and lead to London and Bristol. The number of sailing-vessels registered at the port on Dec. 31, 1847, was, under 50 tons, 206 (6277 tons); above 50 tons, 190 (28,390 tons); besides which there were 5 steam-vessels. Granite, slate, limestone, and marble, are quarried in the neighbourhood. The limestone or marble of the Oreston quarries, on the shore of Catwater, opposite to Plymouth, was the material chiefly employed for the breakwater. Near these quarries is a beautiful iron bridge of five elliptical arches over Catwater, built at the sole expense of the Earl of Morley. In 1834 a floating steam-bridge was established across the Hamoaze between Devonport and Torpoint, which conveys mail-coaches, carriages, horses, and passengers.

The municipal borough is divided into 6 wards, and is governed by a mayor, 12 alderman, and 36 councillors: the population in 1841 was 36,527. The parliamentary borough returns 2 members; the population in 1841 was 35,040.

PLYMPTON. [DEVONSHIRE.]

PNEUMATICS. This name is given to that part of physics in which are contemplated the mechanical properties of elastic fluids, principally atmospherical air. The word is derived from πνεῦμα, 'breath' or 'spirit.'

The ascent of water in pumps, on raising the piston, must have been for ages observed, without a suspicion being entertained of the cause; and the principle that the existence of a vacuum was impossible, was held to afford a sufficient explanation of the phenomenon. The steps by which Torricelli arrived at the discovery of the true cause, and, at the same time, the determination of the pressure of the atmosphere by the weight of the column of mercury supported in a tube closed at the upper extremity, are mentioned under the word BAROMETER.

Soon after the commencement of the 17th century, the idea of ascertaining with precision the state of bodies with respect to temperature by the expansion of fluids when acted on by heat, is said to have occurred to the members of the Academy del Cimento at Florence; and this gave rise to the invention of an instrument of great importance, as well for many occasions of ordinary life, as for the purposes of pneumatical science. [THERMOMETER.] About the year 1660 Boyle in England and Mariotte in France determined from experiments, that when the temperature was constant, the density of air was proportional to the compressing force; but it was not till a century afterwards that De Luc determined the expansion consequent upon given increments of temperature.

The law of the resistance of the air to bodies moving in it was discovered by Sir Isaac Newton. The expansion of fired gunpowder has been determined from the researches of Robins, Euler, and Hutton; and that of steam has been investigated by Dalton in England, and by Prony, Arago, and other members of the Institute, in France.

The simple experiment of pouring mercury into a bent tube open at one end and closed at the other, by which the air in the closed part becomes reduced in volume, having shown that the volumes of the condensed air vary inversely as the weights of the mercury and atmosphere by which the compression is produced, it follows that the densities are directly proportional to the compressing weights; also, since these are balanced by the elastic power of the condensed air, it seems to follow that the elastic force is also directly proportional to the compressing force, that is, to the density. This is the law of Boyle and of Mariotte, and though it cannot be said to be absolutely correct, it is very generally employed. The law being admitted, it may be easily proved that the particles of an elastic fluid repel each other with a force which varies inversely as the distance between them. Sir I. Newton however observes (lib. ii., prop. 23, schol.) that this law holds good only when the repulsive power of any particle does not extend much beyond those which are nearest to it.

Considerable difficulty is found in determining the specific gravities of gases with precision, and different experimenters have obtained results which do not exactly agree. The value generally adopted for air when the height of the column of mercury in the barometer is 30 inches, and the temperature by Fahrenheit's thermometer is 55°, is 1.22 ounces avoirdupois, or 534 grains troy. The experiments of Mr. Dalton have led to the conclusion that the weight of a cubic foot of steam when at the temperature of boiling water, and the height of the barometrical column is 30 inches, is 253 grains troy; by others it has been found to be 254.7 grains. The absolute value of the expansion of a gas is not precisely known; that of air is stated to be equal to about $\frac{1}{490}$, and that of steam about $\frac{1}{438}$ of the volume, for one degree of Fahrenheit's thermometer.

Since the volume of an elastic fluid increases proportionally to the temperature [ELASTICITY], it follows that the density of an elastic fluid varies directly as the compressing force and inversely as the temperature.

The following table, from the observations of MM. Dulong and Petit, exhibits the volumes assumed by a given quantity of air at different temperatures betwen the boiling-point and near the freezing-point of mercury:—

Temperatures.	Volumes.
—33°	0.8650
32	1.0000
212	1.3750
302	1.5576
482	1.9189
680	2.3125

The elastic force, or the equivalent pressure, of air (upon a square inch of surface), in terms of its density and temperature, is expressed by the formula

$$\frac{D' p\ (1 + .0021\ d)}{D}$$

in which D represents the density or specific gravity of the air at the temperature 55° (Fahr.), and D′ is the density of the air under the required pressure; $p = 14.75$ lbs., and $d =$ the number of degrees of temperature above or below 55°.

From experiments it has been concluded that while steam is in contact with the water from which it is formed its expansive force increases in a geometrical progression, when its temperature is increased in an arithmetical progression; but the relation between the elastic force of this gas and its temperature, in that state, is as yet far from being certainly known. The following table may however be useful as a means of affording a near estimate of the force at high temperatures. The first column contains the temperature of the water and steam in degrees of Fahrenheit's thermometer; the second is the measure of the expansive force by the number of inches in the height of the column of mercury which on a given superficies would counterbalance it; and the third, the like measure expressed by multiples of the weight of the atmospherical column when the air is in its ordinary state.

Temperature.	Inches.	Atmospheres.
212°	30	1
220	35.54	1.18
240	51.7	1.72
260	72.3	2.41
280	101.9	3.06
300	139.7	4.66
357	296.79	98.93
408	541.5	18.05
435	719.8	239.94

When steam is not in contact with the water from which it is formed, and when it is subject to a constant pressure under which it may expand in every direction (as when it is formed in the atmosphere), an increase of temperature will not produce an increase of density, but merely of its elastic power. But if the steam is incapable of changing its volume, as when it is contained in a close vessel, the elastic force increases by an increase of temperature in the same proportion as the volume would have increased under a constant pressure; whence it may be shown that, if t denote any given temperature in the last table, and F the compressing force corresponding to that temperature (expressed by the height of the mercury, in the second column), the specific gravity, or weight in grains, of a cubic foot of steam at the given temperature, and under the given pressure, will be obtained from the formula

$$\frac{254.7\ \mathrm{F}}{20.52 + .0447\ t}$$

The expansive force of fired gunpowder has been found to be above 2000 times as great as the pressure of the atmosphere in its ordinary state.

It may be easily shown, the temperature of the atmosphere and the force of gravity being supposed constant, that, if a vertical column of the atmosphere were divided into concentric strata of small and equal heights, the densities of the air in those strata, from any point downwards, would increase in a geometrical progression, while the distances of the strata from the same point would form an increasing arithmetical progression; and on this circumstance is founded the approximative formula for determining the heights of mountains by the barometer. [HEIGHTS, MEASUREMENT OF.]

Water boils when the elastic power of the vapour formed from it is equal to the incumbent pressure; and consequently the temperature at which the boiling takes place in the open air will depend upon the weight of the atmospherical column above it. On this principle the Rev. Mr. Wollaston constructed an instrument called a thermometrical barometer, by which the relative heights of stations can be found. A tube containing the mercury is provided with a graduated scale, and, when used, the bulb is placed in a vessel of water, which is made to boil by means of a spirit-lamp.

Since it has been discovered that the temperatures of the boiling point form a decreasing arithmetical progression, at heights from the level of the sea which constitute an increasing arithmetical progression, and that the differences of the heights are 549.5 feet for each decrement of temperature equal to one degree of Fahrenheit's thermometer; it follows that the heights of stations may be determined by simple proportions.

The velocity with which air, steam, or any other elastic fluid, flows into a vacuum through an aperture in a vessel follows the same law as water or any other non-elastic fluid [HYDRODYNAMICS]; for though the quantity of fluid passing through the orifice in a given time varies with the density of that which successively comes to the orifice, yet the pressure by which it is forced out varying in the same proportion, the velocity, by dynamics, remains constant. A column of air in its ordinary state, extending to the top of the atmosphere, rushes through an orifice into a vacuum with a velocity (= 1339 feet in a second) equal to that which a heavy body would acquire in falling through a height equal to that of a homogeneous atmosphere. Thus, also, knowing the temperature of steam, and consequently its elasticity, or the equivalent pressure, we can find the height of a homogeneous atmosphere which would produce the same pressure; and then the velocity with which the steam flows into a vacuum would be equal to that acquired by a body in falling down the height of such atmosphere. But if the steam is to flow into any elastic fluid of less density than itself, the height of the homogeneous atmosphere

must correspond to the difference of the pressures arising from the different elasticities of the two fluids.

The time during which air, in the ordinary state, must flow through an orifice into an exhausted vessel before the air in the latter acquires any given density D′ is expressed by the formula

$$\frac{2\,V}{A\sqrt{2gh\,D}}\,(D-D')^{\frac{1}{2}}+D^{\frac{1}{2}}$$

in which V is the interior volume of the vessel, A the area of the orifice, D the ordinary density of the air, g the force of gravity (32.2 feet), and h the height of a homogeneous atmosphere.

The density of the air in the receiver of an air-pump, after n strokes of the piston is expressed by

$$D\,\frac{v^n}{(v+v')^n}$$

in which D is the density of the air in the receiver when the process of exhaustion commences, v is the volume of the receiver, and v' that of the barrel. [Aero-Dynamics; Balloon; Gunnery.]

PNEUMONIA. [Lungs, Diseases of the.]

PO, a river of Italy, called *Padus* and *Eridanus* by the Romans, rises from two springs, in about 44° 40′ N. lat., 7° E. long., on the eastern side of Mount Viso, a splendid mountain pyramid 12,580 feet high, the upper part of which is covered with perpetual snow. The sources of the Po are about 6000 feet above the sea. The river flows, in a direction generally eastwards, through or near the towns of Carignano, Turin, Chivasso, Casale, Valenza, Piacenza, Cremona, Guastalla, and Ferrara. The chief rivers which it receives on the north or left bank are—the Chisone, Dora Riparia, Stura, Orca, Dora Baltea, Sesia, Agogna, Terdoppio, Ticino, Lambro, Adda, Ollio, Mincio, Bianco, Polesella, Tartaro, and Adigetto: these are named in their order from west to east. The Po receives on its south or right bank the rivers Vraita, Maira, Grana, Tanaro, Scrivia, Staffora, Trebbia, Nura, Taro, Parma, Lenza, Crostolo, Secchia, and Panaro. The most important of these tributaries, in respect to their length and the towns which they pass through, are the Ticino, Mincio, Tanaro, and Trebbia.

About five miles north from Ferrara, the Po divides into two branches; the left or northern branch is called Maestra, or Po Grande, and also Po delle Fornaci; it enters the sea by several mouths, the principal of which, called Maestra, is always navigable by merchant vessels. The length of course from the point of bifurcation to the mouth is about twenty miles. The right or southern branch, called Po d'Ariano, also divides into several mouths, the principal of which is called Po di Goro, and is likewise accessible to merchant vessels from the sea. The tide is only felt in a slight degree about seven or eight miles above the mouths, and it does not rise quite two feet. The whole course of the river, including its windings, is reckoned at about 450 miles.

The width of the bed of the Po, from the confluence of the Ticino to its bifurcation, is from 1200 to 1800 feet. The depth of water varies from 12 to 36 feet. The periodical floods take place in the summer months, in consequence of the melting of the snows in the Alps, but extraordinary floods occur at other seasons also after great rains. From the confluence of the Ticino to its mouth, a distance of about 200 miles, the fall in the bed of the river is about 300 feet of perpendicular height. The Po is not fordable below Turin, and has no bridge across it below that city. It is embanked from below Piacenza to the sea, to protect the country from inundations. The delta of the Po may now be considered as terminating on the south at Primaro: it extends to the northward as far as the mouth of the Adige at Brondolo near Chioggia, distant from Primaro about 40 miles in a direct line from north to south, unless we consider the mouths of the Brenta and Bacchiglione as forming part of it, as those rivers are connected by canals with the Adige, and the Adige communicates with the Po. In this latter sense the delta of the Po would include all the sea-coast to the northern extremity of the lagoons of Venice, and the river Piave would form the northern boundary of the basin of the Po. The Piave, Livenza, Tagliamento, and Isonzo have each a small separate basin.

The basin of the Po covers an area of about 40,000 square miles.

POA, the Greek name (πόα) for grass of any kind, is applied by botanists to a genus of Grasses belonging to the tribe *Festucineæ*. The species are abundant in Europe, the most common of all flowering plants being *Poa annua*, the little annual grass which springs up everywhere, flowering and ripening its seed at all seasons when not actually frozen. *Poa pratensis*, Smooth-Stalked Meadow-Grass, is found in most pastures. Thirteen species of this genus are described by Babington as natives of the British Islands.

POACHING. [Game-Laws.]

POCKLINGTON. [Yorkshire.]

POCOCK, EDWARD, was the son of the Rev. Edward Pocock, vicar of Cheveley, in Berkshire. He was born at Oxford, in November, 1604, and received the early part of his education at the free school of Thame. At the age of fourteen he was entered a commoner of Magdalen Hall. After two years' residence there, he was elected to a scholarship of Corpus Christi College, to which he removed in 1620. In November, 1622, he was admitted bachelor of arts. He now began to apply himself to the study of the Oriental languages. His first work was an edition of such parts of the Syriac New Testament as had not been edited; it was published at Leyden in 1630, 4to. In 1629 he was ordained priest, and soon after appointed chaplain to the English merchants at Aleppo, where he resided five or six years, and improved his knowledge of the eastern languages. On his return to England in 1636, he was appointed first professor of the Arabic lecture founded at Oxford by Archbishop Laud. He undertook a second voyage to the east with John Greaves, and stayed some time at Constantinople, where he collected manuscripts. When he returned to England in 1640, he found his patron Laud in the Tower. He resumed his lectures at Oxford,

but immediately after Laud's execution the profits of his lectureship were seized as part of Laud's property, and Pocock had only his rectory of Chaldrey, in Berkshire, which his college had given him in 1643. In 1646 Pocock married the daughter of Thomas Burdett, and in the next year, through the influence of his friend Selden, he obtained the restitution of his salary. In 1648 he was made professor of Hebrew at Oxford. He was in danger of being deprived of his living in 1655, on 'the ground of ignorance and insufficiency,' a charge preferred against him by Cromwell's committee; but, on the representation of Dr. Owen and other friends, proceedings against him were abandoned. At the Restoration (June, 1660) Pocock was reinstalled in his canonry of Christ Church, as originally annexed to the Hebrew professorship by Charles I. In this year he was enabled, by the liberality of Mr. Boyle, to print his Arabic version of the treatise of Grotius 'De Veritate.' In 1670 appeared his most important work, the translation of the entire works of Abu-l-Faraj, which, with the text and a few excellent notes, was printed at Oxford in 1663, 2 vols. 4to. He died in September, 1691, in his eighty-seventh year, after a laborious life, in which he obtained a great reputation as an Oriental scholar, and left behind him a name illustrious in the annals of England. Only a few of his works are mentioned here.

Pocock had by his marriage with Miss Burdett nine children, the eldest of whom, named Edward, was also an Oriental scholar, and published in 1671, under his direction, the philosophical treatise of Ibn Tofayl, with a Latin translation and notes, the same which Ockley afterwards translated into English. He also translated into Latin the work of Abdallattif on Egypt; but it was not printed until the beginning of the present century, when White published it with the original text, Oxford, 1800, 4to. Another of Pocock's sons, named Thomas, translated into English the work entitled 'De Termino Vitæ,' by Manasses Ben Israel, under this title—'Of the Term of Life,' London, 1699, 12mo. An account of the life and writings of Pocock, the father, was published in 1740, by Leonard Twells, M.A., with an edition of his Theological Works, in 2 vols. folio.

POCOCKE, RICHARD, was born in 1704, at Southampton. He was entered at Corpus Christi College, Oxford; in 1731 he took the degree of bachelor of laws, and two years afterwards that of Doctor. After travelling, in 1734 and 1736, on the Continent, he sailed for Egypt, and visited various parts of Asia, returning home by Italy, Germany, and Flanders. On his return in 1741 he published the result of his researches, under the title of 'Description of the East and of some other Countries.' In 1745 he was appointed archdeacon of Dublin, and in 1756 bishop of Ossory. He was subsequently transferred to Elphin, and lastly to Meath, where he died, in Sept. 1765. Besides his 'Description of the East,' Pococke published several works on British Antiquities.

PODLACHIA. [POLAND.]

PODOLIA, or *Kamenetz Podolsk*, a government of European Russia, formerly a part of Poland, extends from 47° 25′ to 49° 45′ N. lat., and from 26° 20′ to 28° 50′ E. long. It is bounded on the N. by Volhynia, on the N.E. by Kiew, on the E. and S.E. by Kherson, on the S. by Bessarabia, and on the S. and S.W. by Austrian Galizia. Podolia is generally a table-land of no great elevation, and is traversed by a branch of the Carpathians, which enters it from Galizia; but the most elevated parts of this chain are scarcely 500 feet above the level of the sea, and only heighten the picturesque beauties of this fine province. The chief rivers are the Dniester and the Bug. The climate is mild and healthy, and the soil proverbially fertile. The peasants have generally gardens, where they cultivate cabbages, onions, cucumbers, water-melons, and some fruit trees, mostly apples, pears, cherries, and plums, but no great care is bestowed on them. Cattle, horses, sheep, swine, poultry, and bees are reared. The fisheries are very productive. There is no metal except bog-iron. The other mineral products are saltpetre, stone for building, lime, gypsum, and alabaster. The manufactures are of very little importance, and not sufficient even for the supply of the inhabitants. The population in 1846 was 1,703,000. The greater part of the inhabitants are of the Greek religion. The Roman Catholics are numerous, as are also the Jews. There are some colonists, and some Greek and Armenian merchants.

The principal town is Kaminiec, the capital of the province, on the river Smotriza, at a short distance from its junction with the Dniester. It was formerly the most important fortress in Poland, but is now deprived of its fortifications. It consists of the upper town, of the lower, which is well built, and several suburbs. It has a very fine cathedral, some manufactories and trade, and 16,000 inhabitants, half of whom are Jews. The other principal towns are the capitals of the circles (12 in all), but none of these are of great importance. Mohilew alone has 7000 inhabitants, a silk manufactory, and some trade.

PODOPHTHALMA, *Podophthalmians*. Dr. Leach divided his *Podophthalma* into the two orders of *Brachyurous Crustaceans* and *Macrurous Crustaceans*. Latreille and Desmarest make the first order of the *Podophthalma* the *Decapoda*, and the *Brachyura* and *Macrura* families. M. Desmarest thus defines the *Podophthalma*:—

Composite eyes placed at the end of a movable peduncle; no simple eyes; mandibles provided with a palp; jaw-feet always having a palp adhering to their base.

M. Milne Edwards makes the Podophthalmians the first legion of the subclass of *Maxillated Crustaceans*, and observes that the Crustaceans of which this grand division is composed present such multiplied analogies to each other, that it is impossible to refuse to unite them in the same group.

According to the system of M. Milne Edwards, the Podophthalmians form two orders, the *Decapods* and *Stomapods*. This division, he observes, is generally adopted, but the greater number of authors establish it on the number of thoracic members which constitute the locomotive appa-

ratus; whilst, according to his rule, it is in the disposition of the respiratory apparatus that we ought to look for the principal bases.

PODOPHY'LLEÆ, a small group of polypetalous Exogens, by some regarded as a distinct natural order, and by others referred to *Ranunculaceæ* as a section. *Podophyllum peltatum*, or May-Apple, is not uncommon in gardens, whither it has been introduced from the United States, where it is employed as a safe and active cathartic.

PODOSTE'MMA'CEÆ, an obscure natural order of tropical submersed aquatic plants, with minute incomplete flowers.

PŒCILO'PODA, M. Latreille's name for his sixth order of *Crustacea*, and arranged by him under his second subclass, *Entomostraca*.

The following is M. Desmarest's character of the order:—Head confounded with the trunk; a shell, on the anterior of the body in the form of a buckler; mouth in the shape of a beak, or composed of appendages which cannot be compared to mandibles; antennæ short and simple or null; often eyes distinct and sessile; anterior feet terminated by one or two hooks or by claws, fit either for walking or prehension; the posterior feet destined for natation, either composed of or accompanied by branchial laminæ, or membranous and digitated.

POELEMBURG, CORNELIUS, born at Utrecht in 1586, studied painting under Abraham Bloemart, and went subsequently to Rome. He excelled all his contemporaries in the delicacy of his taste and the vividness of his colouring, as well as in the choice of his subject. Poelemburg was invited by Charles I. to London, where he painted many fine pictures. The genuine pictures of Poelemburg are extremely scarce, but his disciple, Jean van der Lis, imitated his manner with such success that his paintings are often taken for works of his master. Dr. Waagen mentions several works of Poelemburg in English collections, besides the National Gallery, London.

POETRY, in the usual signification of the word, is applied to any composition in metre. It is commonly used to designate the outward form, not the style or the subject-matter. As however there are certain subjects, feelings, and language, which constitute poetry, a prose composition, in which these characteristics are visible, is often termed poetical, just as a bad poem is called prosaic.

The art of poetry is an imitative art; but illusion is not its province. The imitative power of art consists in producing results resembling but not identical with those created by natural objects, or by human passion, character, and action. Hence the difference between a diorama and a picture, or between a waxwork figure and a statue: illusion is the aim of the one; imitation, properly so called, of the other. The metre too in poetry preserves this essence of art by operating as a constant barrier against any approach to reality, at the same time that it acts as a powerful auxiliary to the sense.

The next question is, in what mode does poetry imitate? Painting and sculpture copy outward forms themselves; poetry and music, being restricted to instruments of a different kind, aim at imitating the effect of those forms, that is to say, at producing the pleasurable emotion in the reader or the hearer, though in these cases they cannot imitate the means. On the other hand, the two former arts can only represent one moment of action or expression, and must tell their story by selecting that moment properly; music and poetry can supply a succession of images and sentiments all going to make up a whole. There is one advantage which poetry possesses over all its sister arts, viz. that of being able to assert; as it is the only art which employs words for its instruments, it is the only one which can enounce a proposition, and command this element of the moral sublime.

Poetry, ποίησις, or 'making,' seems to be so called because good poetry creates or re-embodies the impressions which the poet has imbibed into his own mind by observation. This faculty of producing from such elements the impression of individual character, action, or scenery, is the power which we generally term imagination. Without it the attempt at imitation must necessarily fail. Wordsworth (Preface to 'Lyrical Ballads') says, 'Poetry is the spontaneous overflow of powerful feelings; it takes it origin from emotion recollected in tranquillity.'

POGGIO. [Bracciolini.]

POGGY ISLANDS. [Nassau Islands.]

POGO'NIAS (Barbets), a genus of birds placed by Swainson and most authors among the *Picidæ* or Woodpeckers. [Barbets.]

POINCIA'NA ACULEA'TA, or the Barbadoes Flower-Fence, has acquired its name from having been used, on account of its prickly branches, as a material for hedges in the West Indies, for which however it is ill adapted, because its branches are not much subdivided, and are always naked next the root. It is among the most beautiful of plants, and is chiefly on that account cultivated in the West Indies, to which it was introduced from the East Indies, where it is common in gardens, flowering and seeding all the year round. The leaves when bruised have a smell of savin.

POINT. [Solid; Surface; Line; Point.]

POINT OF CONTRARY FLEXURE. By this term is understood a point at which a curve changes its curvature with respect to any given external point, being concave on one side and convex on the other.

POILLY, FRANÇOIS, a distinguished French engraver, was born at Abbeville, in 1622. He was the pupil of P. Daret, and studied some time in Rome. His master-piece is the print from Mignard's celebrated picture, now lost, of San Carlo Borromeo administering the Sacrament to the Milanese attacked with the Plague. Poilly died at Paris in 1693. His brother Nicolas Poilly and nephew Jean Baptiste Poilly were likewise distinguished engravers.

POINDING, in the law of Scotland, is a process for enforcing payment of a debt, against the property of the debtor. It is divided into 'personal poinding,' and 'poinding of the ground.' The former is the method by which any ordinary creditor attaches the movables of his debtor; the latter is peculiar to the holders of real rights over estates belonging to others—as to superiors en-

titled to feu duties or the holders of real securities entitled to payment of the interest, who can by this process attach the rents or other proceeds of the estate, and pay themselves. Personal poinding, which is the most usual form, is of very frequent occurrence, and is a rapid and effective process. The procedure was simplified and regulated, and was brought within the authority of the sheriff's local court, by 1 & 2 Vict. c. 114.

POINTER, a variety of the Dog used in shooting, and trained to stop and point where the game lies. This variety is the *Chien d'Arrêt* of the French, and the *Canis familiaris avicularis* of Linnæus.

POISON. In examining a case of suspected poisoning, the chief circumstances to be attended to are the symptoms presented during life, the examination of the body after death, the chemical analysis of the substances in which the poison may be mixed, and the experiments by which it is attempted to produce similar circumstances in animals by similar means.

The circumstances that usually first excite the suspicion of poison having been taken, are, that the person affected is suddenly attacked by symptoms of severe illness, which come on soon after eating or drinking, without any premonitory indications, which regularly increase in severity without undergoing any important change in their character, and which rapidly prove fatal. But these symptoms may also come on from several diseases.

In no case, therefore, can the general symptoms of poisoning excite more than suspicion; they may all have been produced by some spontaneously occurring disease. But, on the other hand, the absence of any or all of them is not sufficient to disprove the suspicion of poisoning. Small and often repeated doses of poison may be given so as to produce all their symptoms and death very gradually; and the patient may in such a case exhibit numerous alternations of increase and diminution of the symptoms.

Dr. Christison divides poisons into three classes, *Irritants*, *Narcotics*, and *Narcotico-Acrids*. Each of these produces certain symptoms in addition to those belonging to poisons of all kinds, and certain morbid effects upon the organs of the body when it proves fatal, by which their action may in some cases be recognised.

The chief symptoms caused by the internal administration of *Irritant Poisons* are those of severe irritation of some or all parts of the alimentary canal. They commonly excite burning heat, redness and swelling, and sometimes ulceration of the lining of the mouth, throat, and tongue, difficulty of swallowing, burning pain of the stomach, with nausea and retching or vomiting, tenderness on pressure, and tension of the upper part of the abdomen. The matters vomited consist, first, of the food or other contents of the stomach, and afterwards of tough mucus with more or less of blood and bile; the sickness is almost incessant, and is usually accompanied by severe suffering. The pain commonly extends from the stomach along a part or the whole of the digestive canal, with tenderness on pressure, and usually a constant and painful diarrhœa of mucus with more or less blood. The pulse is quick and feeble; there is great prostration of strength, excessive burning thirst, cold and damp skin, extreme anxiety of countenance and manner, and often considerable difficulty of breathing.

These symptoms are however presented in many forms of idiopathic disease, so that in a fatal case of suspected poisoning by an irritant substance, it will seldom be possible to decide upon the evidence of the symptoms alone. Recourse must therefore be had to post-mortem examination.

The most general morbid appearances produced by the irritant poisons are either the destruction, by corrosion, of the tissues over which they pass, or some of the effects of acute inflammation in them. These are redness, discoloration and softening of the mucous membrane. Lymph is often effused, and ulceration and perforation occur. But these appearances should not be considered as conclusive unless by chemical tests the presence of the poison has been detected.

The symptoms produced by the different *Narcotic Poisons* are more varied than those of the irritant class. The most common are, giddiness, headache, obscurity or deprivation of the sight, stupor or perfect insensibility, loss of power of the voluntary muscles, or convulsions of various kinds, and, towards the close, complete coma. To these the several species of narcotic poisons add effects peculiar to themselves; yet not so remarkable but that they are closely simulated by those of some naturally occurring diseases. The symptoms of apoplexy, for example, are almost exactly similar to those of poisoning by opium and the substances allied to it. In certain cases however the following circumstances may distinguish them. Apoplexy, though its actual attack is sudden (which the effects of opium are not), is often preceded by warning symptoms, such as headache, occasional giddiness, &c. If so severe as to simulate poisoning, it is not possible to arouse the patient from his stupor; but in poisoning with opium this may usually be effected to within a few hours of death; in apoplexy, convulsions often occur, in poisoning with opium, never; in the former the pupil is commonly dilated, in the latter contracted. Narcotic poisoning, if not fatal in twelve hours, is usually recovered from; apoplexy often terminates fatally after several days.

These distinctions will seldom serve further than to establish a very probable conclusion; and doubt may still remain in cases of this kind after a post-mortem examination. The evidence of poisoning afforded by it is commonly negative. The fulness of the vessels of the brain and the other slight differences from the appearances found in the average of healthy persons, that are commonly quoted as signs of the effects of narcotic poisons, are very unsatisfactory. *It is probable that narcotics destroy by producing a kind of apoplexy*; and in many cases the changes of structure to which they lead exactly resemble those of that disease, whether of those cases of it which are attended with effusion of blood in or upon the brain, or of those in which only the least possible alteration from the healthy structure can be de-

tected. Effusion of blood in the brain however is very rarely the effect of narcotic poisoning, and such an appearance would by itself afford strong evidence of apoplexy, the result of disease.

The symptoms of epilepsy are often very like those of poisoning by prussic acid, and by some other narcotic and narcotico-acrid poisons, as belladonna, strychnia, &c. The following circumstances, however, distinguish epilepsy: the fit is often preceded by warnings; it almost always commences suddenly and violently; the patient cannot be roused from it. When fatal (which it very rarely is in a first attack), it is so only after several hours. In many cases the post-mortem examinations of epileptic patients detect no signs of disease; and in these there must always be some doubt, as this negative character is common to them and to narcotic poisoning. But in many, traces of old disease in the brain are found, which of course afford strong presumptive evidence that poison has not been taken. If a patient has died in a fit resembling those of epilepsy, and no morbid changes are found in his brain, poison must be strongly suspected, because it is very rare for such a fit, the result of disease, to terminate fatally, except in those whose brains are previously much diseased.

On the whole however it must be concluded that the evidence afforded by symptoms and morbid appearances is less frequently conclusive in cases of poisoning by narcotics than in those where it is produced by irritants. The effects of the *Narcotico-Acrids*, which are compounded of those of the two other classes, are also in most cases as uncertain as those of the narcotics, and the difficulty with them is much increased by the present imperfection of the chemical tests of their presence in organic mixtures.

The evidence to be drawn from experiments with the substances supposed to contain the poison can rarely be needed, or be of much weight when obtained. In any case in which there is sufficient poison present to produce symptoms in any animal to which it is given, it ought to be discovered by the much more certain test of chemical analysis. This last, the evidence of chemistry, is certainly the least fallible of all; and in cases in which it can be applied, it is conclusive.

We subjoin a list of the substances which should be administered in cases of poisoning, as early as possible after the poison has been swallowed.

Mineral Acids (*sulphuric, muriatic, &c.*).—Chalk* or magnesia in water; soap and water, and afterwards milk and other diluents.

Alkalies (*soda and potash*).—Vinegar and water; almond or olive oil; any innocent acid with water.

Oxalic Acid.—Large quantities of chalk or magnesia; afterwards milk and other mild fluids.

Arsenic.—Powerful emetics if vomiting has not commenced; large quantities of milk or some thick bland fluid, such as flour and water, or sugar and water.

Corrosive Sublimate, and other compounds of Mercury.—White of eggs beaten up with water; decoction of bark or gall-nuts.

Blue Vitriol, and other compounds of copper.—White of eggs with water; sugar and water.

Antimony.—Large quantities of warm water or milk; decoction of bark or gall-nuts.

Nitrate of Silver (*lunar caustic*).—Common salt and water.

White Vitriol, and other compounds of zinc.—Milk; carbonate of soda in water.

Compounds of Lead.—Emetics, sulphates or bicarbonates of soda or potash in water; milk.

Laudanum and other preparations of Opium.—Emetics; dashing of cold water on the face; strong coffee; forced exercise by constant walking.

Prussic Acid.—Hartshorn, to be smelled and taken in small doses; chlorine; dashing with cold water.

Strychnine, and other vegetable Alkalies.—Emetics; warm water; decoction of bark or of gall-nuts.

For other kinds of poison, as for many of these, it will always be right to excite copious vomiting, either by tickling the throat, or by giving a powerful emetic, such as from ten to twelve grains of sulphate of zinc (white vitriol), or the same quantity of powdered ipecacuan with one or two grains of tartarised antimony. The action of the emetic should be maintained till all the poison seems to be discharged, by repeated draughts of milk, or flour and water, or sugar and water, or some other bland fluid. For the subsequent treatment no general rules can be given.

POISONING, SECRET. Among the Romans secret poisoning was very prevalent. Tacitus ('Annal.,' xii. 66; xiii. 15) mentions several instances, and many are recorded in Grecian history. Beck in his 'Medical Jurisprudence,' says 'Theophrastus speaks of a poison prepared from aconite which could be moderated in such a manner as to have effect in two or three years, or at the end of a year or two years; and he also relates that Thrasyas had discovered a method of preparing from other plants a poison, which, given in small doses, occasioned an easy but certain death without any pain, and which might be kept back for a long time without causing weakness or corruption. This last poison was much used at Rome about two hundred years before the Christian æra.' The poisons used by the Greeks and Romans seem to have chiefly belonged to the vegetable kingdom, and most of them were obtained, it is supposed, from aconite, hemlock, and poppy. One of their animal poisons is said to have been the acrid juice secreted by a species of *mollusk*, called the Sea-Hare, the *Aplysia depilans* of Linnæus. They do not seem to have been acquainted with mineral poisons.

In modern times secret poisoning has often been carried on to a great extent; and the aid of poison appears sometimes to have been resorted to to obtain credence for the powers of the witch and the wizard. A singular combination of poisoners was discovered at Rome during the pontificate of Alexander VII. in 1659 [Aqua Tofana]; and in France about the year 1670 occurred the crimes of Margaret d'Aubray, wife of the Mar-

* In any cases in which chalk is recommended, the plaster of the ceiling or walls of a room rubbed into powder and mixed pretty thickly with water may be used with equal advantage.

quess de Brinvilliers. [BRINVILLIERS.] The principal poison used by herself and accomplices was corrosive sublimate. The practice at this time had extended so widely in France that the government thought it necessary in 1679 to institute a court under the title of Chambre de Poison, or Chambre Ardente. The powers of this court however were abused, and very shortly after its institution it was suppressed.

Wherever evidence has been left sufficiently positive to admit of an inquiry into the nature of these secret poisons, it has been found that they contain ingredients well known at the present day. It is only where the sciences of chemistry and medicine are not sufficiently known, or where they are neglected in the inquiry, that poisoning can take place with impunity. Secret poisoning is not uncommon amongst uncivilised nations. Dr. James, in his account of Major Long's Expedition, says that 'The celebrated chief, Black Bird, of the Omahaws, gained great reputation as a medicine man; his adversaries fell rapidly before his potent spells. His medicine was arsenic, furnished him for this purpose by the villainy of the traders.'

POISSON, SIMEON DENIS, was born June 21, 1781, and was admitted in 1798 a pupil of the École Polytechnique. He never held any political situation, or took a public share in anything but education. In 1828 he was baron, officer of the legion of honour, repetiteur-adjoint and permanent examiner of the Polytechnic School, member of the Council of Public Instruction, and of the Academy of Sciences. He died April 25, 1840.

The greater part of Poisson's writings are contained in periodicals. His separate works are—1, 'Traité de Mécanique,' Paris, 1811, 2 vols. 8vo.; 2, 'Nouvelle Théorie de l'Action Capillaire,' Paris, 1831, 4to. 3, 'Théorie Mathématique de la Chaleur,' Paris, 1835, 4to.; 4, 'Recherches sur la Probabilité des Jugemens en Matière Criminelle et en Matière Civile,' Paris, 1837, 4to.

POISSY. [SEINE-ET-OISE.]

POITIERS, the capital of the French department of Vienne, is situated on a rocky hill on the left bank of the Clain, a feeder of the Vienne, in 46° 34′ 55″ N. lat. 0° 20′ 9″ E. long., 190 miles by railway S.S.W. from Paris, 60 S. by W. from Tours, and has 24,721 inhabitants. It is one of the oldest towns in France, and occupies the site of *Lemonum*, the chief town of the Pictones, which is mentioned by Julius Cæsar ('Bell. Gall.' iii. 11; vii. 75; viii. 26), and which afterwards took the name of Pictones or Pictavi, whence the present names Poitiers for the town and Poitou for the province are said to be derived. Upon the downfall of the Roman Empire, the town was pillaged by the Vandals, A.D. 410; it subsequently came into the hands of the Visigoths, from whom it was taken by the Franks. The neighbourhood of Poitiers has been the field of three of the greatest and most decisive battles ever fought in France; the defeat of the Visigoths under Alaric in 507 by Clovis and his Franks at Vouillé, a village a few miles west of the town; the defeat of Saracens under Abd-el-rahman under the walls of Poitiers by the Franks, commanded by Charles Martel in 732; and the victory of the Black Prince at the head of 8000 English and Gascon soldiers in 1356, over an army of 50,000 French troops under Jean II., who was taken in the action. By the marriage of Eleanor of Guienne to Henry Plantagenet, Poitiers came into the hands of the English kings, who held it till 1204, when it was wrested from them by Philippe Auguste. By the treaty of Bretigny in 1360 it was ceded to England, but it reverted to France in 1372, by the voluntary surrender of the townsmen to Charles V. For fourteen years, while the English were masters of the greatest part of France, Charles VII. kept his court and parliament in Poitiers, and great additions were then made to the extent of the town. During the religious wars it was taken from the Huguenots by the Catholics, and was the scene of great cruelties; admiral Coligny made an unsuccessful attempt to retake it in 1569.

Poitiers is inclosed by old turreted walls pierced by six gates, four of which open on bridges over the Clain. The space within the walls comprises large gardens and orchards, so that the extent of the place is much greater than the population would lead one to suppose. The streets are mostly narrow and steep; a few of them have been widened and modernised of late years; the leading thoroughfares are well paved and furnished with sidepaths for foot passengers. On the whole it is an irregular ill-built place, with houses mostly old, lumbering, and inconvenient, squares small and mean; yet its position on a hill-slope above the winding river, and its public buildings, remarkable for their antiquity, give Poitiers a picturesque and interesting appearance. The most remarkable structure is the cathedral of St.-Pierre, which was commenced by the English Henry II. in 1152, but not finished till 1379. The western front, which is flanked by two low but graceful towers, presents three magnificent portals of great depth and richly decorated, the central one being surmounted by a handsome rose window. The interior consisting of choir, nave, and aisles, is 323 feet long, 99 wide, and 96 high; in the choir are 70 stalls of carved woodwork, which date from the 13th century. The other remarkable churches are—the church of Sainte-Radegonde, with a crypt and nave, which date from the 12th century; the church of Montierneuf, which belonged to a Benedictine abbey and was finished in 1096; the church of Nôtre-Dame, a Byzantine structure, which, dating partly from the 9th, partly from the 11th century, is the admiration of archæologists for its magnificent portal, and the delicacy and multiplicity of its sculptured ornaments; the church of St.-Porchaire; what remains of the ancient basilica of St.-Hilaire erected in the beginning of the 11th century; and near the cathedral the church of St.-Jean, a venerable monument of the 5th century, which now serves for a museum of antiquities. In the centre of the town stands a large building called le Palais, formerly the residence of kings and of the hereditary counts of Poitou, but now used as a town-hall and chambers for the courts of justice. The house

occupied by Diane de Poitiers still stands at the corner of the streets St.-Paul and du-Coq. Besides the collection of antiquities, Poitiers has a public library of 25,000 volumes, a cabinet of natural history, a botanical garden, and a departmental nursery. Of Roman structures there are still remaining some arches of an aqueduct to the south of the town, and within the walls the ruins of a vast amphitheatre, which is called les Arènes.

Poitiers gives title to a bishop, whose see is formed by the departments of Deux-Sèvres and Vienne; it is the seat of a High Court and University Academy, which have jurisdiction over the departments of Charente-Inférieure, Deux-Sèvres Vendée, and Vienne. Connected with the University Academy, there are in the town a faculty of law, a secondary school of medicine, and a national college. The other institutions of the town are tribunals of first instance and of commerce, a consultative chamber of manufactures, a free school of design and architecture, and several literary, scientific, artistic, and agricultural societies.

The chief manufactures are coarse woollen cloth, blankets, hosiery, lace, playing-cards, vinegar, leather, and dressed skins. The trade in these articles and in seeds, wheat, wine, hemp, flax, wax, honey, hides, and dressed goose-skins, with the down on for furriers, is considerable.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

POITOU, a province of France which now forms the departments of Vienne, Deux-Sèvres, and Vendée, was bounded N. by Anjou and Bretagne, E. by Touraine, Berri, and Marche, S. by Saintonge and Aunis, and W. by the Ocean. It was divided into Haut-Poitou and Bas-Poitou, which had Poitiers and Fontenay for their respective capitals. Poitou is the country of the Celtic Pictones. Under the Roman Empire it formed part of Aquitania Secunda; it was invaded successively by the Vandals, the Visigoths, and the Franks; and was under the sway of the last, governed by its own counts, until it fell into the hands of the English on the marriage of Henry Plantagenet to Eleanor of Guienne in 1152. Conquered by Philippe Auguste in 1294, it was ceded to the English by the treaty of Bretigny in 1360, and finally reunited to the crown of France in 1375 by Charles VII. The inhabitants of the province were called Poitevins. (Thibaudeau, *Abrégé de l'Histoire de Poitou*, 3 vols. 8vo., Paris, 1839; Bealy, *Histoire des Comtes de Poictou*, 8vo., 1840.)

POL-DE-LEON, ST. [FINISTE'RE.]

POL, ST. [PAS-DE-CALAIS.]

POLA. [ILLYRIA.]

POLAND. The comparatively small portion of the once powerful kingdom of the Jagellons, which, under the name of the Kingdom of Poland, forms an integral part of the Russian Empire, is nearly of a quadrangular shape, each side being about 200 miles long. There is besides, a long narrow slip. The whole area is 49,000 square miles. The population in 1846 was 4,857,700. It is situated between 50° 4′ and 55° 5′ N. lat., and between 17° 30′ and 24° 20′ E. long. It is bounded on the N. by East and West Prussia, on the E. and N.E. by Wilna, Grodno, and Volhynia, on the S. by Galizia and Cracow, and on the W. by Silesia and Posen.

Soil and Surface.—Though Poland is generally considered a perfect level, the surface exhibits considerable diversity, and some districts rise many hundred feet higher than others. The boundary between Poland and East Prussia occurs at the swelling ridge, 400 or 500 feet high, which forms the southern extremity of the plain of the Baltic. The most southern districts of Poland, the greater part of the provinces of Cracow and Sandomir, and that portion of Lublin which lies between the rivers Vistula and Wieprz, are hilly, and rise in some places to a considerable elevation. The surface of the Vistula above Sandomir is about 600 feet above the sea-level. Near 51° 30′ N. lat. is the western extremity of that large region of swamps which forms the boundary between the rivers that run to the Baltic on one side and to the Black Sea on the other, and which extends in a north-north-east direction to the banks of the river Duna, occupying in some places more than a hundred miles in width. The soil varies greatly in different parts, from dry sterile sand, to rich fertile soils on the banks of the rivers. The range of temperature is very great: the summers being very hot, and the winters often intensely cold.

The most considerable rivers are the Niemen and Vistula or Wisla [NIEMEN; VISTULA], which are navigable for large river-barges as far as they drain Poland and flow along its boundary-lines. The other principal rivers are the Wieprz, Bug, Narew, Pilica, Warta, and Prosna. Lakes are most numerous in the north-eastern district, but are not large. The largest lake, that of Goplo, which is about 10 miles long, lies on the north-western boundary-line.

Productions.—Though Poland is not distinguished by fertility, it produces more grain, hemp, flax, and tobacco, than are required for its consumption, and it exports these articles to other countries. Wheat is only abundant in the hilly southern region; the principal species of grain which are cultivated in the other parts of the kingdom are rye, oats, and buckwheat; barley is also raised, but less extensively. Leguminous vegetables are much valued, and their cultivation attended to. Horses, cattle, hogs, sheep, and goats, are reared. As a considerable part of the country is still covered with forests, timber constitutes an important article of export. The forests consist of oak, ash, lime-trees, and birch, but chiefly of pine and fir. Wild animals are numerous, especially wolves, which annually destroy many sheep. Bears and lynxes have become rather rare, as well as the beaver, ermine, and elk; but deer, foxes, martens, polecats, badgers, and weasels, are still very common.

Several metals and minerals are abundant in the hilly region. Among the metallic ores are those of silver, iron, copper, lead, and zinc. Rock-salt, marble, and a little coal, are met with.

Divisions.—The kingdom of Poland is divided into eight provinces or governments.

1. *Cracow* lies between 50° 8′ and 51° N. lat.,

and between 19° and 21° 15′ E. long. The area is 4450 square miles; and the population about 470,000. The Vistula, Nida, and Pilica flow through it. It is divided into four circles, Kielce, Olkusz, Miechow, and Stobnica. The chief towns, next to Cracow (which belonged to the old Polish Kingdom) [CRACOW], are Kielce, 5000 inhabitants; Pinczow, 4200; Chenciny, 2600; and Slawkow, 2100. The republic of Cracow was incorporated with Austria in 1846. [CRACOW.]

2. *Sandomir* is situated between 50° 25′ and 51° 50′ N. lat., and between 19° 50′ and 22° E. long. Its area is 5900 square miles, and the population about 200,000. It is divided into the four circles of Sandomir, Opatow, Radom, and Opoczno. The chief towns are Radom, 3600 inhabitants; Sandomir, 3200, a walled town, with a church, four convents, a synagogue, and a gymnasium; Opoczno, 3600; Opatow, 2600; and Staszow, 3100.

3. *Kalisz* lies between 50° 40′ and 52° 35′ N. lat., and 17° 40′ and 20° E. long. The area is about 6740 square miles, and the population about 620,000. The province is divided into the five circles of Kalisz, Petrikau, Konin, Sieradz, and Wielun. Kalisz, the capital, is one of the handsomest towns in Poland. Most of the houses are built of stone, the streets broad and well paved, and some of them planted with trees. The population amounts to 15,000, of whom 2500 are Jews. There are two Roman Catholic parish churches, three hospital churches, one Lutheran church, a cathedral, six convents, and several manufactories. The other towns are Petrikau, 4400 inhabitants; Konin, 3700; Sieradz, 2700; Wielun, 3200; and Czenstochau, 5000. Near the last-named town is a convent, containing a miraculous image of the Virgin Mary, to which 40,000 pilgrims annually resort, with whom the inhabitants carry on a profitable trade in images, amulets, crosses, beads, &c.

4. *Lublin* lies between 50° 17′ and 51° 43′ N. lat., and 21° 45′ and 24° 7′ E. long. Its area is 6650 square miles, and population 520,000. It is divided into the four circles of Lublin, Zamosz, Krubieszow, and Krasnistaw. Beside the chief town [LUBLIN], there are Lubartow, 3200 inh.; Kurow, 2000; Pulawy (containing the once celebrated palace and treasures of Prince Poniatowski); Zamosz, a strong town with 4000 inhabitants; Krubieszow, 4000; Krasnistaw, 3000; and Chelm, 2100.

5. *Plock* lies between 52° 15′ and 53° 30′ N. lat., and 18° 45′ and 22° 35′ E. long. The area is about 7000 square miles, and the population about 500,000. It is divided into the six circles of Plock, Pultusk, Lipno, Mlawa, Przasnitz, and Ostrolenka. The chief towns are Plock [PLOCK]; Pultusk, 3500 inh.; Wyszogrod, 3600; and Modlin, which is strongly fortified.

6. *Masovia* is situated between 51° 30′ and 52° 55′ N. lat., and 18° and 22° E. long. The area is 7500 square miles. It is divided into seven circles, viz. Warsaw, Stanislawow, Sochaczew, Rawa, Lenczyc, Gostynin, and Cujavia. Warsaw is the capital. [WARSAW.] The other chief towns are Lowicz, Sochaczew, Rawa, Lenczyc, Tomaszow, Alexandrowo, Ozockow, and Kutno. Most of these are manufacturing towns.

7. *Podlachia* is situated between 51° 15′ and 52° 40′ N. lat., and 21° 10′ and 23° 40′ E. long. Its area is variously stated at 4800 and 5300 square miles. It is divided into four circles, Siedlec, Lukow, Biala, and Radzyn. Siedlee, the capital, is a regularly-built town, with a considerable palace and a beautiful park, several churches, a gymnasium, and 4420 inhabitants. The other towns are—Sokolow, Wingrow, Lukow, Wlodawa, Kock, Biala, and Miedzerzyce.

8. *Augustowo* lies between 52° 40′ and 55° 5′ N. lat., and 21° 25′ and 24° 15′ E. long. It is divided into the five circles of Lomza, Augustowo, Seyny, Kalwary, and Mariopol. Suwalky, the capital, was founded about 80 years ago; it has handsome buildings, broad regular streets, and 3000 inhabitants. The other towns are—Seyny, Lomza, Szczuczyn, Wilkowyszki, Neustadt, and Kalwary.

History.—The history of Poland previous to the introduction of Christianity is involved in darkness. Christianity was introduced by the Duke Mieczyslav, A.D. 965, after his marriage with a Bohemian princess. Boleslav was made King of Poland by the Emperor in A.D. 1000, and raised the kingdom to great power. It was still more powerful in the reign of Boleslav II. (1058–1082). Boleslav III. was also a distinguished sovereign; but he destroyed the effects of a brilliant reign by his injudicious partition of the country among his four sons, a custom which was common at that time in many countries. This partition, by destroying the unity of the kingdom and producing internal wars, was productive of much mischief, and arrested the development of the Polish monarchy, which, being the most important Slavonic state, might have become a centre of unity for that race and for a Slavonian empire. Poland recovered from this state of weakness in 1308 under Vladislav II., one of the greatest monarchs that ever governed Poland. The most memorable event of his reign is the first diet of Poland, which he assembled at Chenciny in 1331.

The reign of his son Casimir the Great was devoted to the consolidation of the advantages gained by his father. The first code of laws was published in Poland by his orders at the assembly of Vislitza, A.D. 1347. The native dynasty ended with him. He was succeeded by his nephew Louis, king of Hungary. Although he paid little attention to Poland during his lifetime, Louis was very anxious to secure the throne to one of his daughters, an object which he accomplished by granting to the nobles, or equestrian order, many privileges, and by a considerable reduction of taxes, A.D. 1371. In consequence of this agreement, his youngest daughter, Hedvige, was proclaimed, after his death, Queen of Poland, A.D. 1382, and was crowned at Cracow, being then only 15 years of age. *Jagellon*, whom she afterwards married, brought the whole of Lithuania under the rule of Poland. Jagellon was succeeded by his son Vladislav III., a prince then 11 years old. He was scarcely of age when the Hungarians, threatened by the fast-spreading power of

the Ottomans, invited him to their throne. The young monarch defeated the Turks (1443) in several battles, and advanced to within six days' march of Adrianople. Being afterwards killed in another battle with the Turks, he was succeeded by his brother Casimir. The most important event of Casimir's reign was the union of the Prussian provinces with Poland. The inhabitants of that rich country, wearied of the oppression of the Teutonic Order, declared themselves (1454) subjects of the crown of Poland. Casimir was an enlightened man, and a great patron of learning.

John Albrecht, who succeeded Casimir in 1492, was a warlike prince, but of a careless and indolent disposition. Under his reign, and that of his successor Alexander, the power of Poland was diminished by the Turks, the Muscovites, and the Tartars. Sigismund, who reigned from 1506 to 1548, was an accomplished, energetic, and successful prince. In his transactions with the Emperor, the Pope, the Czar, the Sultan, the Tartars, and his own nobles, he displayed great wisdom and moderation. The troubles produced by the Reformation of Luther in the Prussian provinces induced Sigismund to repress them by severe measures, which were however taken from political motives, and not from any religious intolerance; for Sigismund on many other occasions showed himself very tolerant towards the doctrines of the Reformation.

Sigismund died in 1548, and was succeeded by his son Sigismund Augustus, who died without issue, in consequence of which the Jagellon dynasty became extinct, and Poland became an elective monarchy in practice, instead of being so merely in theory. It was during the reign of Sigismund Augustus that the doctrines of the Reformation acquired a great influence in Poland, particularly among the higher classes; so that there was a time when its complete triumph was expected by the enemies and equally dreaded by the adherents of Rome.

The interregnum produced by the death of Sigismund Augustus (1572) was dangerous to the peace of the country, particularly as the election of the new king was embarrassed by religious differences. Austria, France, Sweden, and Muscovy, all put forth candidates. The choice fell on Henry Valois of France; his reign was short and inglorious; but his successor Stephen Battory, a native of Hungary, was a valiant and successful king. After his death another struggle took place; which ended (in 1586) by the election of Sigismund III. This king was vacillating and untrustworthy; and involved his kingdom in repeated contests with the neighbouring countries, which were generally unsuccessful.

Sigismund III. died in 1632, in the 66th year of his age. Bigoted in his attachment to the Roman Catholic church, he thought more about the conversion of his opponents than about the interests of his country. Protestantism, which was prevalent in many parts of Poland, was almost entirely destroyed by his efforts. Sigismund's son Vladislav IV. was elected without opposition. He was a virtuous and enlightened prince; and succeeded in repelling the attacks of the Muscovites and Turks against Poland. After his death in 1648, Poland was involved in religious quarrels between the Roman and Greek Catholics, arising from the favours which the Jesuits had received from Sigismund. John Casimir, who reigned from 1648 to 1668, was engaged first in quelling religious contests among his own subjects, and then in repelling Swedes, Muscovites, Cossacks, Tartars, and Turks, all of whom had been in turn invited to assist one or other of the contending parties.

On the death of John Casimir there were several candidates for the throne of Poland, but the minor nobility, jealous of the overgrown influence of the magnates, proclaimed as king Michael Prince Wisniowietzki, a young man who had no pretensions to this dignity. His reign was unfortunate, and it required all the brilliant talents of his successor, John Sobieski, to prevent the kingdom from falling to pieces. [SOBIESKI.]

Under the succeeding monarchs Poland fell more and more under the power of Russia; while the internal government of the country was becoming totally disorganized. The constantly increasing power of the equestrian order almost rendered government impossible, and the law was braved with impunity by many powerful nobles, who, although legally on the same footing as the poorest nobles, were as powerful as independent sovereigns. A preposterous system of education, which was entirely in the hands of the Jesuits, had so benighted the nation, that it remained satisfied with its condition, imagining itself to be free, while in fact it was governed by foreign influence.

At length came the time of the spoliation of the kingdom. In order to save the country from foreign influence, a confederation was organized at Bar, a little town in Podolia, by the patriotic bishop of Kamieniec, Adam Krasinski. Ill supported, and without any regular troops, it struggled for several years against the forces of Russia, until it fell by exhaustion. The Turks, who had taken up arms in favour of Poland, after having represented in vain to the cabinets of Europe the danger of Russian predominance in Poland, were defeated; and the first partition of Poland, which was planned by Frederic II. of Prussia, took place in 1772. By this partition Poland lost, of the 13,500 square miles (15 to a degree) of its territory, 3925 square miles, which comprehended its best provinces, and were unequally divided between Russia, Prussia, and Austria. The spoliating parties called a diet to sanction this iniquitous transaction, and imposed on the country a permanent council, which deprived the king Poniatowski even of the shadow of authority. This great calamity roused the nation, which now strove to compensate its heavy loss by internal improvements; but matters were in too unsound a state for any revival of power; and in 1793 a second grasp at the defenceless country was made. By this second partition Prussia took 1061 square miles (15 to a degree), Russia 4553, and Poland retained 4016. The spirit of patriotism was however not quelled by these circumstances. An extensive conspiracy was organized, and insur-

rections broke out in several parts of Poland. In 1794 Kosciusko arrived at Cracow, and, having assembled a number of peasants armed with scythes, he defeated a superior number of Russian regular troops. The inhabitants of Warsaw, which was occupied by a strong Russian army, rose against their oppressors, and expelled them after a bloody contest. Vilna did the same. But all this was unavailing. Kosciusko was defeated, and the remainder of Poland was divided, in 1795, among Russia, Prussia, and Austria. Poland was thus erased from the list of independent states.

At the congress of Vienna in 1815, the plenipotentiaries of Great Britain and France, Castlereagh and Talleyrand, were in favour of the restoration of Poland, to which Austria was not averse. But the landing of Napoleon from Elba created interests of a more pressing nature, and the affairs of Poland were arranged in the following manner:—A part of the duchy of Warsaw, containing about a million of inhabitants, was given to Prussia under the title of the duchy of Posen. The salt-mines of Vieliczk and some districts were given to Austria. Cracow, with a territory of 500 English square miles, and about 120,000 inhabitants, was erected into a republic; and the remainder was entitled the kingdom of Poland, and united to Russia under one sovereign. The new kingdom received a representative constitution, which guaranteed security of person and property in the strictest sense, the liberty of the press, the responsibility of ministers, the independence of the judges, the use of the national language, and a national military force.

Such a liberal constitution, granted to a kingdom with 4,000,000 of inhabitants, whose sovereign was monarch over more than 50,000,000 subjects, was a perfect anomaly. It could not be expected that such a constitution should be faithfully maintained; and it was not. Russia gradually disappointed all the hopes which the Poles had entertained; and after fifteen years of irritation, the Poles made a last but fruitless attempt to regain their national independence by the insurrection and unsuccessful battles of 1830.

POLAND—*Language and Literature.* [Slavonian Language and Literature.]

POLANISIA, a genus of plants belonging to the natural order *Capparideæ*. *P. icosandra* is native of the East Indies, and is used in Cochin China as a counter-irritant in the same way as sinapisms in Europe, and as a vesicant. The root is used as a vermifuge in the United States of America. *P. graveolens* is native of North America, and is employed as a vermifuge.

POLAR BEAR. [Bear.]

POLAR REGIONS, NORTH. The term *Polar Seas* is generally used to indicate those portions of the ocean which extend from the polar circles to the poles themselves. As the ocean in these parts is generally encumbered by large fields of ice, and the air is frequently loaded with dense and heavy fogs, the navigation is extremely perilous, and was for a long time avoided by the most adventurous seamen. But the experience of the whalers, during the course of two centuries, showed that these seas could be navigated with a certain degree of safety, if the seamen united boldness with care and precaution; and to this experience we owe the great discoveries which have been made in those seas during the last thirty years.

That part of the globe which lies within the north polar circle comprehends the most northern portions both of the old and of the new continent; and the term North Polar Sea, or Arctic Ocean, is applied to that part of the sea which divides the northern coasts of Europe and Asia from those of America. Both continents terminate towards the north pole, near 70° N. lat., which may be considered as the general boundary line of the North Polar Sea. This sea is united to the Pacific by the narrow Strait of Behring. [Behring's Strait.] The sea by which it is united to the Atlantic is as wide as the average width of the last-mentioned ocean, and hence the North Polar Sea is frequently considered as the most northern portion of the Atlantic.

That part of the Arctic Polar Sea where it borders on the Atlantic contains one of the largest archipelagos on the globe. The middle of it is occupied by Greenland, which may be considered as the main land of the archipelago. Its northern parts are buried under enormous masses of eternal ice. On the east of it is the extensive group of islands known under the name of Spitzbergen, the small island of Jan Mayen, and Iceland. On the west of Greenland, and divided from it by Davis's Strait and Baffin's Bay, there is a considerable number of islands of great size, some of which are separated from the main land of America by very narrow straits. Cockburn Island, the North Georgian Islands, Banks's Land, Victoria Land, Wollaston Land, and Boothia Felix, are among the most important of the recently-discovered land near the north coast of America. The northern boundary of America along this coast is noticed under North-West Passage. Sir James Ross and Sir John Richardson, who have recently (Nov. 1849) returned from an unsuccessful search for the missing expedition of Sir John Franklin, have not been able to add much to the previously-existing knowledge of these regions. Dr. Rae is wintering near the northern coast, with the intention of renewing the researches in 1850.

If we divide the Arctic Sea into two equal parts, by the meridians of 117° W. and 63° E., one of these parts will communicate with the Atlantic, and the other with the Pacific. The former is much less incumbered with ice than the latter, and is still the resort of whale ships. Between Spitzbergen and Greenland vessels have advanced as far as 81° N. lat. British whalers almost every year sail up to the most northern extremity of Baffin's Bay (77° N. lat.), and Parry in his first voyage succeeded in advancing westward as far as 117° W. long., but here he met an impenetrable barrier of ice. On the other side, the Russian navigator Ziwolka, who surveyed the island of Novaïa Zemlïa in 1836, found no difficulty in tracing the western coast to Cape Nassau, and even the eastern to 61° E. long.; but im-

penetrable masses of ice prevented his advance farther to the east. It is known that a current sets in from south to north through Behring's Strait; but Parry found a current from north to south in the Atlantic outlet of the North Polar Sea. Parry, in his fourth and last voyage, when he tried to get to the pole over the ice, was prevented from executing his bold design by the masses of ice which occur north of 81°, on the north of Spitzbergen, being carried by the current southward, so that he lost every day as much as he had gained by moving forwards; in fact he was advancing against the current. If a similar enterprise should ever be again undertaken, the attempt must be made in the opposite direction, where most probaby the current would be favourable.

POLAR REGIONS, SOUTH. [SOUTH POLAR REGIONS.]

POLARISATION OF LIGHT and HEAT. *Polarisation of Light* is (if we consider light to consist of particles which are transmitted in rectilinear directions from a luminous body) the effect of an attraction exercised by the particles of what are called double refracting crystals, or of certain reflecting surfaces, upon the particles of light when these pass through the former, or are incident upon the latter at a particular angle. By those attractions the particles, considered as not perfectly spherical, are supposed to suffer such changes of disposition, that their axes, or their homologous faces, become parallel to one another, or are directed towards the same part of space. But if we adopt the undulatory hypothesis, a different explanation must be given. In this case (understanding that the vibrations of the ethereal medium, in causing the perception of common light, take place in any direction in planes at right angles to the direction in which the ray is moving), when a ray is polarised in the ordinary manner the vibrations still take place in planes perpendicular to the direction of the ray, but in lines parallel to one another. A plane passing through the direction of the ray and perpendicular to all the lines of vibration is called the plane of polarisation.

Huyghens was the first who discovered that when a pencil of light falls upon a prism of Iceland spar in any direction except one, it divides into two pencils in passing through it, and presents to the eye a double image of the object from whence the pencil proceeds; he observed also that one of these images was formed by a refraction of the usual kind, that is, having the usual relation between the sines of the angles of incidence and of refraction, and that the other was not so formed, the ratio of the sines not being constant. He called the pencil by which the first image was formed the ordinarily refracted ray; and the other the extraordinarily refracted ray. Iceland spar crystallises in the form of a rhomboid, and when the light falls in the direction of its axis (a line making equal angles with the three planes meeting at one of its obtuse solid angles) the two pencils are coincident.

Huyghens also observed that, if the two pencils formed by one which had been made to fall perpendicularly on the natural face of the rhomboid of Iceland spar are suffered to fall upon a second rhomboid placed so that two like natural faces are parallel to or in contact with each other, each of the first refracted pencils is not divided into two, but in passing through the second rhomboid the ordinarily refracted pencil suffers only the ordinary refraction, and the extraordinarily refracted pencil suffers only the extraordinary refraction. The same thing takes place when, keeping the same faces in contact, one of the rhomboids is turned about through an angle of 180°, so that the ends are reversed. But the same faces being in contact, when one of the rhomboids is turned either way so as to be at right angles to its first position, each pencil, after passing through the first rhomboid, though it suffers only one refraction in the second, changes its character; that which was before ordinarily refracted now becomes extraordinarily refracted, and the other becomes ordinarily refracted. In all other positions of the rhomboids each of the two pencils is divided into two in passing through the second; the angle between them varying according to the position of the rhomboids with respect to each other.

The circumstances just mentioned show that the ordinary and extraordinary pencils, in passing through one rhomboid, acquire properties of a like kind with respect to two planes passing through the incident pencil at right angles to one another. If one of these be the principal plane of the crystal (a plane passing through the axis perpendicularly to one of the natural faces), then, conformably to the undulatory hypothesis, the particles in the ordinarily refracted wave vibrate perpendicularly to that plane, and those in the extraordinarily refracted wave vibrate perpendicularly to the other plane. And it is said that the ordinary wave is polarised in the principal plane, while the extraordinary wave is polarised in a plane perpendicular to that plane.

Effects corresponding to those produced by Iceland spar are observed when the light of a candle is viewed through a thin and polished plate of tourmaline, whose surfaces are parallel to the geometrical axis of the prism, which by crystallisation the body forms. The plate being held perpendicularly to a line drawn from the candle to the eye, that light will appear equally distinct in every position of the plate; but the plate being fixed, if the pencil from the candle be made to pass through a second plate parallel to the former, and the second plate be turned round in its own plane, the image of the candle will vary in brightness according to the relative positions of the two plates. If the axes of the plates (lines in them parallel to the geometrical axes of the prisms from which they are cut) are parallel to each other, the brightness of the image is a maximum, and if the axis of one is at right angles to that of the other, the image vanishes, the light diminishing in intensity from the former position of the axes to the latter in each quadrant of the revolution of the second plate. These circumstances indicate that the luminiferous æther can pass freely through such plates only when the vibra-

tions of its particles in them are performed in lines parallel or perpendicular to the axis of the plate; and that the cause of the light being arrested at the second plate, when its axis is perpendicular to that of the first, is the impossibility of the particles, while so vibrating in passing out of that first plate, finding a passage between the molecules of the other in that position of its axis. Hence it may reasonably be concluded that, by the attractions of the crystal molecules, the vibrations of the particles in the waves of incident light were brought to the directions above supposed.

Double refraction is now known to take place in many crystals; and the line in which the ordinary and extraordinary pencils coincide is called the optical axis, or the axis of double refraction. In Iceland spar it nearly coincides with the shorter diagonal of the rhomboid; but in quartz, tourmaline, and other prismatic crystals, it coincides with the geometrical axis of the prism. All these are called uni-axal crystals, though every line which can be drawn in the prismatic crystals parallel to the geometrical axis has the property of uniting in one the ordinary and extraordinary pencils.

Some crystals have two and others three axes of double refraction; and Sir David Brewster, who discovered the fact (in 1816), found that the two images were united in the bi-axal crystals in the directions of both axes.

Rock crystal, which has the power of polarising light, is also found to have the power of depolarising it, or of reducing it to its ordinary state when the polarised light is transmitted through it in one particular direction. This discovery was made by Sir David Brewster, who also found that the like property existed in Iceland spar, topaz, chrysolite, and several other minerals. Gum arabic, horn, and tortoise-shell were found to depolarise light in every position.

In 1810 M. Malus, a Colonel of Engineers in the French service, communicated to the Institute of France the discovery that when a pencil of light is reflected at some particular angle from the surfaces of transparent bodies, solid or fluid, and also from certain opaque bodies, as black marble and ebony, it becomes polarised, like the pencils which are transmitted through a doubly refracting crystal. Thus, if a pencil fall upon the surface of unsilvered plate-glass at an angle of about 54° 35′ with a perpendicular to that surface, and the reflected ray be transmitted through a rhomboid of Iceland spar, whether the principal section of the rhomboid be parallel to the plane of reflection (plane of the incident and reflected rays), or whether it be perpendicular to it, the pencil suffers no extraordinary refraction; but in all other positions the pencil is divided into two in passing through the rhomboid, as if it had previously been refracted in a rhomboid of the spar. It may be observed that the polarisation of the light takes place simultaneously at the upper and under surfaces of the glass plate, the pencil of light being incident on the former surface at the angle above mentioned, though it is obvious that the angle of incidence at which the pencil falls on the latter is less than that at which the pencil fell, before refraction, on the upper surface.

When the reflecting surface is water, the light is found to be polarised when the angle of incidence is 52° 45′; and it is found that when the tangent of the angle of incidence is equal to the refractive index (the quotient which arises on dividing the natural sine of the angle of incidence by that of the angle of refraction) of the glass or transparent medium from whose surface the light is reflected, the whole of the reflected light is polarised; just as the ordinary pencil produced by the first rhomboid of Iceland spar would be if its principal plane were parallel to the plane of reflection, and common light had passed through it instead of being reflected from the medium.

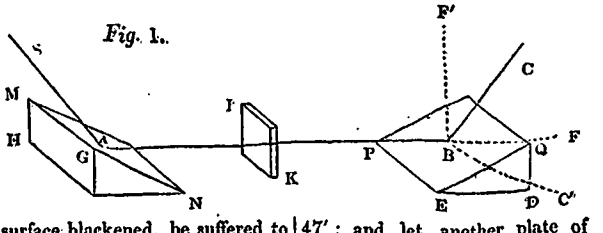
[Circular Polarisation; Elliptic Polarisation; Polarised Rings; Undulatory Theory of Light.]

Professor Forbes, of Edinburgh, has succeeded in polarising, both by reflection and refraction, radiant heat, whether proceeding from the sun or from terrestrial bodies, and whether luminous or not. By delicate experiments he has even obtained evidence of a circular and an elliptical polarisation of heat; and it is thence inferred that heat is propagated by undulations of the ethereal medium, the waves, in certain states, interfering with one another like those of light. The instrument employed for the purpose of measuring the intensities of heat is said to be capable of indicating an increment of temperature equal to about $\frac{1}{1500}$ of a degree of Fahrenheit's thermometer. Mr. Forbes has also depolarised heat; and, since depolarisation is a consequence of double refraction, it follows that the existence of a doubly refractive property in heat is thus demonstrated.

POLARISED RINGS, splendid phenomena observed when polarised light is transmitted through plates of some doubly-refracting crystal.

Let a plate of glass in any position, as MN,

Fig. 1.

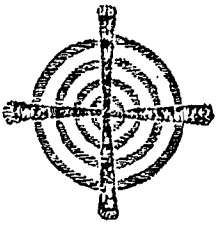


having its under surface blackened, be suffered to receive a slender pencil of light SA from the sky or a lamp at an angle of incidence equal to 56° 47′; and let another plate of glass PQ, also blackened on the under side, be placed so as to receive, at an equal angle of incidence, the re-

flected pencil AB, the latter being, in consequence of the reflexion at A, polarised in the plane SAB. The plate PQ should be attached, as in the figure, to the surface of the block PQED, which should be capable of being turned on an axis, as BF, in the direction of the ray AB produced.

Now if PQ be turned so that the reflected pencil BC is in a plane ABC′ at right angles to the plane SAB, on placing a thin plate of Iceland spar, ruby, or other uni-axal crystal, cut with parallel surfaces, each perpendicular to the axis of the primitive crystal, in a position, as IK, such that the polarised ray AB may pass perpendicularly through it, an eye looking through a small aperture at C′ will see in the field of view a number of concentric circular rings of

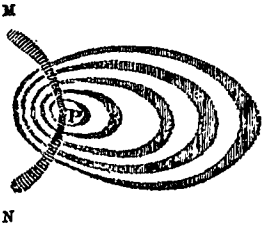
Fig. 2.



different colours, traversed by a black cross consisting of branches at right angles to one another. When the phenomenon is observed with common white light polarised as above said, the centre of a field is occupied by a black spot surrounded by a deep blue colour, which gradually declines to whiteness; and, proceeding from the centre outwards, the colour becomes successively a pale yellow, orange, and deep red, similar to the first series of Newton's rings. [Colours of Plates.] The colours in the succeeding rings are arranged in the like order till the rings cease to be perceptible, the cross remaining black.

Now, if a plate of any bi-axal crystal, as mica, nitre, &c., be placed as at IK in the direction of the polarised pencil, and be turned so that one of the optic axes is coincident with that pencil, the plate PQ being turned as before, there will be seen, about a dark point P (Fig. 3), a series of oval

Fig. 3.



rings brightly coloured, and divided unequally by a dark band MN. A like series of rings about a point corresponding to P, with a dark band like MN passing through that point, will be seen if the plate of crystal be turned so that the other optical axis is in the direction of the polarised ray AB. And when the angle which the optical axes make with one another, or with a perpendicular to the surface of the crystal, is small, as in nitre, both series of rings with their bands may be seen at the same time.

For explanations of the phenomena of polarised rings on the undulatory hypothesis, see Airy's 'Tracts' and Sir John Herschel's 'Treatise on Light,' in the *Encyclopædia Metropolitana*.

POLARITY signifies, in general, a disposition in a body or in an elementary molecule of a body to place its mathematical axis in some particular direction. Frequently also it denotes in a body the existence, either naturally or induced, of two points possessing contrary properties.

If iron-filings be strewed over a mass of natural loadstone, it will be found that there are two points on its surface at which the filings are most abundantly attracted, and where they dispose themselves nearly in the direction of a line imagined to be drawn through the mass. [Magnetism.] From an analogy with the axes and poles of the earth, this line is called the axis of the loadstone, and its extremities are called the poles. The like disposition of the filings takes place on a magnetised bar of steel [Magnet], and the poles or opposite extremities of either material are found to possess a contrariety of character. One extremity always tends towards the northern part of the horizon only, and the other towards the southern part; and if two such prisms or bars are formed, and suspended by their centres of gravity, on bringing the northern or southern pole of one near the like pole of the other, they exercise upon each other a mutual repulsion; but if either pole of one be brought near the opposite pole of the other, they mutually attract each other. In order to account for such polarity it is supposed that the magnetic power in the earth by some means disturbs the equilibrium previously existing among the molecules of magnetic fluid in the natural loadstone or artificial magnet, forcing those which have contrary properties towards the opposite extremities of the mass.

If a cylinder of wood or metal be insulated on a glass stand, and it be then brought near a body which has been electrified by the usual machine, it will be rendered polar, that is, one end will possess the vitreous or positive electricity, and the other the resinous or negative electricity, and near the middle the cylinder will be in a neutral state. Polarity is also obtained by what is called galvanism. In a galvanic battery, the fluid, by chemical action on the zinc, produces a separation of the two kinds of electricity; that which is called positive is carried to the copper plate, and the latter communicates it to the zinc plate with which it is connected. This action is repeated at every pair of plates in the battery; and the zinc extremity constitutes the positive pole of the battery. At the same time an opposing current of negative electricity passes from the copper, through the fluid, to the zinc, from thence to the next copper plate, and so on to the last; this copper end is called the negative pole of the battery.

A magnetised steel bar, when tried by means of a small compass needle, is often found to exhibit, at different places in the direction of its length, a change from boreal to austral magnetism,

and the contrary. These places are called consecutive poles. The intensity of the force, either of attraction or repulsion, exercised by one of the poles of a magnet on any body is inversely proportional to the square of the distance of such body from that pole.

Polarity is also found to exist in the crystals of tourmaline and Siberian topaz when their electrical properties are developed by heat. The crystals of tourmaline are of a prismatical form, and one of these being heated to any degree between about 100° and 212° (Fahrenheit), it is found that its extremities possess opposite kinds (positive and negative) of electricity. This polar axis is coincident with the geometrical axis of the prism. About the middle there is a space in which the electricity is insensible; and when the crystal is broken across, each fragment exhibits the like phenomena. (Hauy, 'Minéralogie,' tom. i.) Boracite, which crystallises in cubes, is found to have four polar axes, the extremities of which possess opposite kinds of electricity when heated. These are nearly in the directions of the four diagonals of the cube.

An analogy has long been known to subsist between electricity, galvanism, and magnetism, in respect of the power of imparting polarity to bodies and of modifying each other's effects. Sir Humphrey Davy, Dr. Faraday, and other philosophers, both in this country and abroad, succeeded in exciting magnetism in steel bars by the galvanic battery. Gold needles galvanised have also been found to acquire polarity, and to be subject, with respect to the horizon and the meridian, to a certain variation and dip, different however from those of a steel bar when magnetised. The method employed by M. Ampère to magnetise needles was to twist a wire spirally about a cylinder, and to place the needle in a glass tube within the spiral; then, connecting the two extremities of the spiral with the poles of a galvanic battery, the needle was found, after a few minutes, to be strongly magnetised.

In 1820, M. Oersted observed that, if a magnetic needle, suspended as usual, be placed under and near the wire connecting the opposite poles of a galvanic battery, the pole of the needle which is nearest to the negative end of the battery declines westward; and if the needle be placed above the wire, that pole declines eastward. The amount of the deviation depends on the distance of the wire from the needle; and when the distance is about three-quarters of an inch, it amounts to about 45°. When the wire is in the same horizontal plane as the needle, the latter suffers no deviation; but if on the western side of the needle, the pole of the needle which is nearest to the negative end of the battery becomes depressed; and if on the eastern side, that pole becomes elevated. The hypothesis proposed by Oersted and Ampère to account for the action of the wire on the needle is, that a current passes along the conducting wire of a galvanic battery from each pole towards the middle, and that these currents, on meeting, turn each other from their rectilinear directions, so that both are compelled to move spirally in opposite directions round the wire. In thus revolving, they act (in directions perpendicular to those of the currents) upon the magnetic particles in the needle, or upon currents supposed to circulate about them, producing changes in the positions of those particles, and thus turning the needle from its place.

Dr. Faraday, by causing a small magnet to float in mercury with its north end upwards, and making a galvanic current enter the mercury by a wire in a vertical position, found that the magnet performed a rotation about the wire. He has also contrived an apparatus by which both wire and magnet are made to revolve about a common centre of motion.

POLDERS. [Holland.]

POLE, POLAR. The word πόλος as applied to a point means a turning or hinge point, and was applied to the points at the extremity of the axis of the celestial sphere in the ancient astronomy. Hence, on the hypothesis of the earth's rotation, it comes to mean the extremities of the axis on which the earth turns. From this primary meaning all the various uses of the word pole have been derived. For example, when it was found that the magnet did not always point to the north pole, but to another point, it was natural to call that other point the *magnetic pole*. A term seldom passes through several significations, however nearly related, without at last becoming generic in the widest sense. The word pole is now used to denote any point which is of so striking a character as to require a distinct name.

POLE. [Perch.]

POLE-STAR. [Ursa Minor.]

POLE, REGINALD, CARDINAL, was born in 1500. His mother was the daughter of George, duke of Clarence, brother to King Edward IV. He was placed when a child in the Carthusian monastery at Shene, and thence removed to Magdalen College, Oxford. As early as 1515 he was made B.A., admitted into deacon's orders, and when only nineteen was made dean of Wimborne and dean of Exeter.

About 1520 he went abroad to pursue his studies at Padua. He returned to England in 1525. When Henry VIII. had resolved on divorcing his queen, Pole presented a strenuous opposition, and wrote his treatise 'Pro Unitate Ecclesiasticâ.' There is little doubt that Pole would have shared the same fate which befel More and Fisher, had he not withdrawn to Rome, where he was made a cardinal, employed on several important embassies, and was in fact a principal adviser to the pope. He re-appeared in his native country at the beginning of the reign of Mary, as legate from the Roman see. He had great influence in the councils of that reign, and accepted the archbishopric of Canterbury when Cranmer was put to death. He was also chancellor of both the universities; and, if any man could have done it, he would have effected the entire reversal of the measures of the Reformation in England, but he died in 1558, a few hours after the queen.

POLECAT. [Weasels.]

PO'LEMO, the name of several Greek writers.

1. *Polemo*, the philosopher, the son of Philo-

stratus, succeeded Xenócrates as the head of the Old Academy about B.C. 315. Zeno and Arcesilas were his disciples. (Cic., 'Acad. Quæst..' i. 9.)

2. *Polemo*, the sophist, born at Laodicea, was a celebrated teacher of rhetoric. He was highly esteemed by Hadrian and Antoninus Pius. He taught at Smyrna. The Life of Polemo has been written by Philostratus. His works are lost, with the exception of two funeral orations, supposed to have been spoken in honour of Cynægirus and Callimachus, who fell in the battle of Marathon. The best edition is by Orellius, Leipzig, 1819, 8vo.

3. *Polemo*, surnamed *Periegétes*, was a native of Samos or Sicyon, and was made a citizen of Athens. He lived about B.C. 200. His works are chiefly historical and geographical. The fragments were published by L. Preller, Leipzig, 1838, 8vo.

PO'LEMO, the author of a work on physiognomy which is still extant, of whose life no particulars are known. He is quoted by Origen, and therefore lived before him, or at least was his contemporary. His work is in two books. In the first, which *contains* twenty-three chapters, he lays down the general principles of physiognomy; he speaks of the shape of the head, of the colour of the hair, of the forehead, the eyes, the ears, the nose, the manner of breathing, the sound of the voice, &c.; in the second book, which consists of twenty-seven chapters, he applies his principles, and describes in a few words the characters of the courageous man, the timid, the impudent, the passionate, the talkative, &c. The best edition is that by J. F. Franzius, who has inserted it in his 'Scriptores Physiognomiæ Veteres,' Altenb., 1780, 8vo., Gr. and Lat., and has added a learned preface and notes.

POLEMONIA'CEÆ, a natural order of monopetalous Exogens. They consist for the most part of gay-flowered herbaceous plants, natives chiefly of North America.

POLEMO'NIUM, a genus of plants, the type of the natural order *Polemoniaceæ*. About twelve species have been described, most of them being cultivated and known in our gardens as Greek Valerian. *P. cæruleum*, Common Greek Valerian, Jacob's Ladder, or Ladder of Heaven, is a native of Europe and America, and is found in Great Britain, but is a rare plant. A great number of varieties have been described.

POLI, JOSEPH XAVIER, was born at Molfetta, in the kingdom of Naples, in 1746. He was educated at the university of Padua, and having entered the army, Ferdinand I. appointed him, in 1776, professor of military geography at Naples. The king also sent him to visit the foreign military academies. Among other countries he visited England, and while in London he was elected a member of the Royal Society. On his return home he was appointed professor of experimental philosophy at Naples, and afterwards tutor to the hereditary prince, and he became director of the military academy at Naples. He died at Naples, in 1825.

Though he successfully cultivated other branches of science and literature, Poli owes his celebrity to his researches in comparative anatomy and natural history. The results of his labours were published in a splendid work, denominated 'Testacea utriusque Siciliæ, eorumque Historia et Anatomia,' folio, Parma. He also wrote several works on geography, and some Italian poems.

POLICE is that department of administration which has for its object the safety and peace of the community.

Its primary object is the prevention of crime and the pursuit of offenders; but the police system also serves other purposes, such as the suppression of mendicancy, the preservation of order in great thoroughfares, the removal of obstructions and nuisances, and the enforcing of laws which relate to the public health.

In the present state of society in the British Islands, the old Anglo-Saxon system of police, with its modifications under the Norman kings, would be altogether inefficient. It would not now be possible to render the hundred responsible for the delinquencies committed within its limits, according to the old practice, and the inhabitants being now, except in a few cases (7 & 8 Geo. IV. c. 31), free from such responsibility, they are careless respecting either the prevention of crime or the apprehension of criminals. The duties of the constable also became in modern times much more complicated, and required the whole of his time. But instead of the constabulary force being re-organised, and adapted to a new state of society, it was suffered to remain, with weaker powers, to cope with circumstances which demanded increased vigilance, activity, and intelligence. The want of confidence in the old police force is attested by the existence of numerous voluntary associations for the apprehension and prosecution of felons, whose funds are expended in the prosecution of criminals, and not in the prevention of crime. Some of these associations have rules which bind the members, as in the case of horse-stealing, to take horse and join in pursuit of the thief. Railway Acts bind the companies to maintain a police during the formation of the line. An Act was passed in August, 1840 (3 & 4 Vict. c. 50), entitled 'An Act to provide for keeping the peace on canals and navigable rivers.' Private watchmen are also extensively employed in docks and warehouses.

To correct the various evils incident to the constitution of the present rural constabulary, the magistrates of Cheshire, in 1829, made the first provincial attempt to improve the administration of police in their county, and they obtained an Act (10 Geo. IV. c. 97) which authorised them to appoint and direct a paid constabulary. The establishment of a new police force for the metropolis, in 1829, has done more towards exhibiting the advantages of employing a trained body of men for all the purposes for which the old constabulary was appointed, than any other circumstance. The act of parliament which created the new police force (10 Geo. IV. c. 44) placed the control of the whole body in the hands of two commissioners, who devote their whole time to their duties: they are immediately responsible to the home secretary of state. By the 2 & 3 Vict. c. 47, the metropolitan police district may be extended to any parish or part of a parish situated

within 15 miles of Charing Cross, the first act having limited its operation to a distance of twelve miles. The number of men of each rank serving in the metropolitan police force in March, 1846, was as follows:—1 inspecting superintendent, salary 600*l.*; 18 superintendents, of whom 15 have salaries of 250*l.* and 2 have a higher and 1 a lower salary; 114 inspectors, 88 of whom have 118*l.* 6*s.* a year; 485 sergeants, of whom 474 have 63*l.* 14*s.*; 4131 constables, those of the first class (1071) have 54*l.* 12*s.*; second class (2013) 49*l.* 8*s.*; third class (1000) have 44*l.* 4*s.* The sergeants and constables are allowed clothing, and each married man of these two ranks is allowed 40 pounds weight of coals weekly throughout the year; each single man is allowed 40 pounds weight weekly during six winter months, and 20 pounds weight weekly for the remainder of the year.

The London police is formed in divisions, and each division is employed in a distinct district. Every part of the metropolis is divided into 'beats,' and is watched day and night. The total disbursements on account of the force, for the year 1845, amounted to 230,042*l.*, one-fourth of which is paid by the treasury out of the public revenue, and the other three-fourths by the respective parishes. Since August, 1839, the horse patrol, consisting of 71 mounted men, who are employed within a distance of several miles around London, has been incorporated with the metropolitan police. The Thames police consists of 22 surveyors, each of whom has charge of three men and a boat when on duty: the number of constables is 27. The establishment is under the immediate direction of the magistrates of the Thames Police-Office. The city of London still manages its own police affairs, which have been placed under a far more efficient system since the establishment of the metropolitan police force.

The police of the metropolis and the district within fifteen miles of Charing Cross (exclusive of the city of London) is regulated by the Acts 10 Geo. IV. c. 44, and 2 & 3 Vict. c. 47; and together they form the police code for nearly a seventh part of the population of England and Wales.

In nearly all the boroughs constituted under the Municipal Reform Act (5 & 6 Will. IV. c. 76) a paid police force has been established as nearly as possible on the same footing as the metropolitan police.

The expense of the eleven police courts of the metropolis, for 1845, amounted to 46,765*l.*, the greater part of which (35,329*l.*) was defrayed out of the Consolidated Fund. The salary of one magistrate (Bow-Street) was 1200*l.* a year; and each of the others, 22 in number, received 1000*l.* The fees, penalties, and forfeitures received at the different courts amounted to about 8000*l.*

The government has not taken any steps for the general establishment of a trained constabulary force in England and Wales; but in 1839 an act was passed (2 & 3 Vict. c. 93) which enabled the justices in quarter sessions to appoint county and district constables, and thus left the improvement of the police to their discretion. A report must be previously made to the secretary of state, showing the necessity of appointing additional constables. By 2 & 3 Vict. no more than one constable could be appointed to each one thousand of the population; but by 3 & 4 Vict. c. 88, this limitation is done away with. The expenses of the police force (rural police) are charged upon the county rate in the several divisions in which the force *has been* appointed. To secure unity of action and general uniformity, the secretary of state is empowered to frame rules for the regulation of the force. The men employed in it are not to exercise any other employment, nor allowed to vote at elections for a member of parliament. Under the provisions of these acts a rural police force has been appointed in several counties. The act 3 & 4 Vict. c. 88, contains provisions for the consolidation of the borough and county police in cases where the respective authorities desire to enter into such an arrangement.

In addition to the two acts above mentioned, there are other statutes which enable magistrates to obtain any additional police force which may be requisite to ensure the conservation of the peace. [CONSTABLE.]

POLICE. In Scotland the larger towns have separate police statutes, by which the management and control of the system is put into the hands of elected commissioners. The act 3 & 4 Wm. IV. c. 46, is a general police act, the provisions of which, or a portion of them, may be adopted, so as to become law, by any royal burgh, burgh of regality, or burgh of barony, at a meeting of a specified number of ten-pound householders. The act provides for the election of commissioners, with power of management and control, by the same class of persons who are entitled to decide on the adoption of the act. By 2 & 3 Vict. c. 65, called the Rural Police Act, the commissioners of supply of any county are authorised, at a meeting called on requisition by ten of their number, to assess the county for maintaining a constabulary force. The act directs the commissioners to publish annual accounts of receipt and expenditure. The system is co-operative with the expenditure of an old established fund for rural police purposes, called the 'Rogue Money.'

POLICY and POLITY. Policy is generally used to signify the line of conduct which the rulers of a nation adopt on particular questions, especially with regard to foreign countries, and according to our opinion of that particular line of conduct we say that it is good or bad policy. Polity has a more extended sense, being synonymous with the principles of government, and this is the sense of the Greek 'politeia' (πολιτεία), from which it is derived. Policy, in an extended sense, is that branch of polity which is concerned with the internal economy of the state. In a more restricted sense it is a branch of preventive administration, distinct from the administration of justice, the object of *which, among* other *things*, is the punishment of *crimes* committed. [POLICE.]

POLICY. [INSURANCE.]

POLIDORO DA CARAVAGGIO. [CARAVAGGIO.]

POLIGNAC, MELCHIOR, CARDINAL DE, was born at Puy in Languedoc, in 1661, of an illus-

trious family. He studied at Paris, and took holy orders. In 1689 he was employed as a negotiator between France and the court of Rome. In 1693 the Abbé de Polignac was sent by Louis XIV. as ambassador to Poland, where, after the death of John Sobieski, in 1696, he endeavoured without success to establish François Louis de Bourbon, prince of Conti, as king of Poland. Louis XIV., being displeased at this result, banished him to his abbacy at Bonport. In 1706 however he was appointed by Louis XIV. auditor of the rota at Rome. In 1709 he returned to France, and in 1710 he was one of the French plenipotentiaries at the congress of Utrecht. In 1713 he was elected cardinal. In 1724 he went to Rome as minister of France. In 1732 he returned, and he died in 1741.

His Latin poem, 'Anti-Lucretius, sive de Deo et Naturâ libri novem,' Paris, 1754, is intended as a refutation of the system of Lucretius, and a demonstration of the existence of a Supreme Being. The ninth book was left unfinished by the author, and the whole poem was not published till after his death.

POLIGNANO. [Bari, Terra di.]

POLIGNY. [Jura.]

POLITICAL ECONOMY. The word Economy is from the Greek *oeconómia* (*οἰκονομία*), 'house-management,' or 'household management,' the notion of which is generally understood. It does not signify in the original language merely 'saving' or 'thrift,' but the judicious and profitable management of a man's property; and this is the sense of the word in the treatise of Xenophon entitled *Oeconómicos* (Οἰκονομικὸς).

Political Economy or Public Economy should mean a management of a State analogous to the management of a private property. But this is not the sense in which the term is used; and the term itself is objectionable by reason of the false analogy which it suggests. It is however true that many governments have acted on the notion that the supreme power should in some degree direct the industry of individuals, and in some degree provide for their wants; and many persons still have an opinion that one of the functions of government is to regulate agriculture, manufactures, and commerce; not to prescribe exactly to every man how he shall employ himself, but to make regulations which shall to a considerable extent direct the industry of the members of the State. Adam Smith gave to his work the title of the 'Wealth of Nations,' a term which indicates much better than the term Political Economy the object of his investigations, which is, 'to explain in what has consisted the revenue of the great body of the people, or what has been the nature of those funds which in different ages and nations have supplied their annual consumption.' The word Wealth indicates that the inquiry is mainly conversant about material results, about the products which man by his labour produces for his necessities and his pleasures. The word Nations implies that the object of the inquiry is the aggregate wealth which any political society acquires; but this investigation further implies an examination into the conditions under which the individual members of a state labour for the production of a nation's wealth, and what they get for their labour; for the wealth thus acquired is not the wealth of a nation in the sense in which some things belong to a nation or to the public. The great mass of products are appropriated by individuals in accordance with the rules of property or ownership, that exist in some form or other in all nations, and the terms of contract between capitalists and labourers. All that is produced, except that part which the State produces as a State, or takes for the purposes of the general administration, is appropriated by individuals, and is either saved or consumed. The term Political Economy would have an exact meaning, if we understood it to express that economy or management which the State as a State exercises or should exercise for the benefit of all. It would comprehend all that the State should do for the general interest, and which individuals or associations of individuals cannot do so well; it would thus in a sense coincide with the term Government. Being thus defined, it would exclude all things that a State as a State should not do; and thus the inquiry into the Wealth of Nations would mean an inquiry into all those conditions under which wealth is produced, distributed, accumulated, and consumed or used by all the individuals who compose any given political community. But though the subject of Government is easily separated from the proper subject of Political Economy, everybody perceives that there is some connection between the two things; and this is the foundation of some of the false notions that have prevented Political Economy from attaining the form of an exact science. Everybody perceives that a Government can do much towards increasing or diminishing 'the revenue of the great body of the people;' but everybody does not see what a Government should do or should not do in order that this revenue may be the greatest and most beneficially distributed.

It is not easy to make an exact classification of the subjects which writers on Political Economy discuss. The matters which they do discuss, and to which most of them limit their inquiries, may be generally enumerated as follows:—The production of wealth and the notion of wealth, which comprehend the subjects of Accumulation, Capital, Demand and Supply, Division of Labour, Machinery, and the like. But all the matter of Political Economy is so connected, that every great division which we may make suggests other divisions. The Profits of Capital and the Wages of Labour, the Rent of Land, and the nature of the Currency, are all involved in the notions of Accumulation, Capital, and so forth.

The way in which 'the revenue of the great body of the people' is distributed, is an inquiry equal in importance to the mode in which it is produced; and the mode and proportions in which it is distributed re-act upon future production. He who receives anything out of the 'revenue' is, by the supposition, a person who has contributed to it, either as a landowner, a capitalist, or a labourer. If he is neither a landowner, nor a capitalist, nor a labourer, he is supported out of

the public revenue either by alms, or by pensions, or by the bounty of parents or friends. Omitting these cases, a man's title to a part of 'the Revenue of the great body of the people,' if it is an honest title, is either the title which he has to the produce of land or capital, of which a portion has been appropriated to him in conformity to the rules which establish ownership, or it is the title of one who labours for hire and receives his pay pursuant to the terms of the contract. The owner of land and capital, if he does not employ it himself, lets others have the use of it in consideration of interest, or rent, or some fixed payment.

The use which a people shall make of their revenue is the last great division of the subject. The analogy here between Economy in its proper sense and the Economy of a People is pretty close. Judicious Economy is the making the best use of one's income; and the best use is to spend it on things of necessity first, on things which gratify the taste and the understanding next, but to put by something as a reserve against contingencies, and as a means of adding still further to our enjoyments. The savings of individuals constitute the savings of the Nation: there is no saving by the Nation as a Nation; the national accumulation is the sum total of individual accumulations.

Consumption may be either consumption for the purpose of further production, or consumption for the sole purpose of enjoyment. This consumption for the purpose of enjoyment is a kind of consumption which some economical writers have scarcely thought of, though all the rest of the world are thinking of it and labouring for it. This consumption for enjoyment may to some extent, and in some cases, coincide with or contribute to further production; but as such, as consumption for enjoyment's purpose, it must not be confounded with any other kind of consumption. The true basis of all those investigations which are included under the name of Political Economy is this: that man desires to enjoy, and that he will labour in order to enjoy. The nature of his enjoyments will vary with the various states of society in which he lives, and with his moral, social, and intellectual character. As he labours in order to enjoy, and as one man gives his labour in exchange for another man's labour, it follows that the exchangeable value of every man's labour will ultimately depend on the opinion of him who wishes to have the fruits of such labour.

If we would investigate the economical condition of a country as to the production of wealth, its distribution, and its consumption, we must ascertain its population, the various kinds of employments, the amount of articles produced, the wages of the labourer, the profits of the capitalist, rate of interest, rent of lands and houses, the various articles consumed, both articles the produce of the country and articles imported, of which the articles exported are the equivalents. We must ascertain the rate at which population increases in a given period, the rate at which permanent improvements, such as roads, houses, docks, and the like, increase, and all improvements of a permanent character. In such an investigation the Economist may proceed on the supposition that man is acting free from all restraint, except the restraint which compels every man to respect his neighbour's property and person; that every man is labouring just as he pleases without constraint or direction; and that every man is enjoying what he produces or what he gets in exchange for his own production, with no other restraint than the law imposes for the protection of other men's property and persons. But such a state of things does not exist, and perhaps never did; and when the Economist has investigated the actual state of a nation's wealth and its consumption, he will have to ascertain how and to what extent men are limited in their industry by positive law, by positive morality, and by anything else. It is his business to detect those artificial restraints which interfere with a man's industry, and consequently with his enjoyment. In his inquiries he must never forget that consumption for consumption's sake is the end of all our labour; not such a consumption as shall destroy wealth, but such a consumption as is consistent with permanent and increased means of enjoyment, both for the actual generation and for an increased number in the succeeding generation. He therefore recognises saving, accumulation, and productive consumption, as necessary means towards the end of increased enjoyment. But he acknowledges no real enjoyment, he does not admit that there is happiness in the degree in which happiness is attainable, and he denies the possibility of improvement of the social condition of a whole people, unless the necessaries of life, such as the country and climate require, are possessed by all—food, raiment, and lodging. When these things can be had, and not before, a man has leisure and inclination to supply other wants that lie dormant while he is hungry, naked, and without shelter against the weather.

The field for the Political Economist is as extensive as society itself; but his labour has certain limits. He may often determine when legislation is unwise, or when it is wanted: but he does not concern himself about the making of the law. He is satisfied if a bad law is repealed, or if, when useful, it is so framed as to accomplish the object. Nor does he concern himself about forms of Polity, or systems of religion, or morals, or philosophy, as such. But he does investigate the mode in which they operate upon industry directly or indirectly, and mainly their mode of operation on the primary wants, those wants which all men seek to satisfy, and which all must in some degree satisfy, or they must cease to live. The great test, the unerring test, of the condition of a nation, is the condition of those who labour for their daily bread. If these have sufficient, it is a certain deduction that others have more than sufficient, and that there may be improvement in the social and moral condition of all classes. But ignorance may prevent improvement. It will, therefore, be the province of the Economist to show how, when the primary wants of a people are satisfied, they may secure, so far as it can be secured, so happy a condition, and also to show

by what combinations the gratification of the secondary wants may be secured with the least trouble and expense. The fundamental principles of the Economist are indeed, as it has been often remarked, very few; and it is equally true that very little can be deduced from them. They must be constantly applied, in the way of test and correction, and the matter to which they must be applied is the experience of man. A wise man neither rejects nor over-values the axioms of his science; but when his subject is 'immersed in matters,' to use an expression of Bacon, he knows better than to expect a few axioms, even if absolutely true, to solve problems, to the whole or parts of which they will often not apply.

POLIZIA'NO, or POLITIANUS, ANGELO, born at Montepulciano in Tuscany, in 1454, was the son of Benedetto Ambrogini, a doctor of law. Lorenzo de' Medici took care of his education, and provided for his wants. He entered into clerical orders, and was made a canon of the cathedral of Florence. He was entrusted by Lorenzo with the education of his children, as well as with the care of his library and collection of antiquities, and he was his guest and companion for the remainder of his life. He was appointed professor of Latin and Greek at Florence. He wrote scholia and notes to many ancient authors, and the 'Scriptores Historiæ Augustæ;' he translated into Latin the History of Herodian, the Manual of Epictétus, the Aphorisms of Hippocrates, some dialogues of Plato, and other works from the Greek. The 'Miscellanea' of Poliziano, published at Florence in 1489, consist chiefly of observations he made on the ancient authors. Polizinno wrote an affecting monody on Lorenzo's death, and not long after died himself, Sept. 1494.

The other works of Poliziano are—1, 'Panepistemon.' 2, 'Sylvæ,' odes, epigrams, and other short Latin poems. 3, His Italian poetry. He also wrote the 'Orfeo,' which is considered as the earliest specimen of the opera, or Italian musical drama. His Latin works, including 12 books of Letters, were published at Paris, fol., 1512.

POLLA'JUOLO, PIERO and ANTONIO DEL, Florentine painters and sculptors of the 15th century. Piero was the pupil of Andrea del Castagno; Antonio was the more distinguished pupil of Lorenzo Ghiberti, whom he assisted in the celebrated gates of the baptistery of San Giovanni; he became also a famous goldsmith, and was as such without a superior in Florence. *Maso* Finiguerra was his contemporary. The two brothers generally executed their paintings together; the best of them, says Vasari, is the Martyrdom of St. Sebastian, painted in 1475, in the church de' Servi at Florence. Antonio Pollajuolo was invited to Rome in 1484, after the death of Sixtus IV., by Innocent VIII., and he made the monuments of Sixtus IV. and of Innocent VIII.; that of Sixtus, in 1493, is now in the chapel of the Sacrament in St. Peter's; the monument of Innocent is also in St. Peter's.

POLLAJUOLO, SIMONE DEL, or Simon Masi, an architect, commonly called Il Cronaca, from his ability in relating stories, was born at Florence in 1454. He was related to Antonio del Pollajuolo, and lived with him some time at Rome. He is chiefly distinguished for the Palazzo Strozzi, one of the most solid and imposing buildings of Florence; it was commenced in 1489 by Benedetto da Maiano, but was completed by Il Cronaca, and the great cornice or entablature and the court in the interior are from the designs of Cronaca. He was a follower of Savonarola. He died in 1509.

POLLEN is the organic matter by which impregnation is effected in the vegetable kingdom. It is to the naked eye a very fine powder, and is usually inclosed in the cells of the anther; but examined with the microscope, it is found to consist of hollow cases, usually spheroidal, filled with a fluid in which are suspended drops of oil from the 20,000th to the 30,000th of an inch in diameter, and grains of starch five or six times as large. The pollen grains, although usually spheroidal, also assume other figures; in some plants they are depressed, in others cylindrical, in others triangular; in most instances they are simple; but in *Inja*, *Acacia*, and the allied genera, and in *Orchidaceæ*, there are several grains adhering in definite or indefinite numbers.

POLLIO, C. ASI'NIUS, born B.C. 76, was descended from a family of no great consequence. On the breaking out of the civil war between Cæsar and Pompeius, Pollio took the side of the former. He was afterwards sent by Cæsar, under the command of Curio, to Sicily and Africa, and after the defeat of the latter by Juba, he escaped with a few of the forces to the neighbourhood of Utica, and thence passed over to Italy to join Cæsar. He was present at the battle of Pharsalia (Plut., 'Pomp.,' 72), and two years afterwards (B.C. 46) he accompanied Cæsar into Africa and Spain. On the death of Cæsar (B.C. 44), he appears to have been inclined to support the senatorial party; but after Octavianus united himself to M. Antonius, Pollio no longer hesitated to support Antonius. He soon afterwards received from Antonius the government of the province of Gallia Transpadana, and was nominated by the triumvirs as one of the consuls for B.C. 40. During his consulship, Virgil addressed to him the fourth Eclogue. In the following year Pollio was sent by Antonius against the Dalmatians, whom he conquered, and obtained the honour of a triumph. He took no part in the war between Octavianus and Antonius. He died A.D. 4.

Pollio was a great patron of learning and the fine arts, and was also the author of several works which were greatly praised by his contemporaries. He founded the first public library at Rome, in the Atrium Libertatis, on Mount Aventine. He lived on intimate terms with Virgil and Horace, the latter of whom has dedicated to him the first ode of his second book. He was a poet, an orator, and an historian. His History of the Civil Wars, which was comprised in seventeen books, is quoted or referred to by several of the ancient writers. All his writings are lost, except a few letters to Cæsar.

POLLOK, ROBERT, a poet and miscellaneous writer, was born at Muirhouse, in the parish of Eglesham, in Renfrewshire, in 1799. He studied

at the university of Glasgow, and afterwards followed the course of theological education necessary to fit him for a charge in the United Secession Church, of which he became a licentiate in 1827. Just before he received his licence, he had finished the poem on which his literary reputation rests, 'The Course of Time,' which exhibits a great command of the English language, and a power of terse, rapid, melodious diction. Before the publication of the poem Mr. Pollok had undermined his constitution by excessive mental labour, and he scarcely lived to see its success. He died Sept. 15. 1827.

POLLUX, JU'LIUS, whose real name is Polydeuces, a celebrated grammarian and teacher of rhetoric, was born at Naúcratis, in Egypt, about the middle of the second century of the Christian æra. He was a favourite with M. Aurelius and his son Commodus, by the latter of whom he was appointed teacher of rhetoric at Athens. He died at the age of fifty-eight.

Pollux wrote several works, all of which have been lost except his 'Onomasticon' (Ὀνομαστικόν), or Dictionary of Greek words, which is not arranged in alphabetical order, but is divided according to subjects, and gives the different Greek words which belong to each subject. Thus all the words relating to agriculture, are classed by themselves, and all words belonging to ships, carriages, houses, &c., are treated of separately. The work contains numerous quotations from Greek writers, and supplies us with much information relating to antiquity. It is divided into ten books, and was dedicated to Commodus during the life-time of Aurelius. The best editions are by Hemsterhusius, who has annexed a valuable Commentary, Amst., 1706, 2 vols. folio, and Dindorf, Leipzig, 1824, 2 vols. 8vo.

Julius Pollux, who lived in the 10th or 11th century of the Christian æra, wrote a 'Chronicle,' or 'Universal History,' from the foundation of the world to the time of Valens. This work has been edited by Bianconi, Bonn, 1779, folio, and Hardt, Munich and Leipzig, 1792, 8vo.

POLLUX. [GEMINI.]

POLO, MARCO, the son of a Venetian merchant named Niccolo Polo, who, with his brother, had travelled and resided from 1250 till 1269 in various parts of Tartary and China. They were well received by several of the khans, particularly by Kublai Khan, with whom they resided for some time at Kemenfu, his seat of government in Chinese Tartary. Kublai Khan at length sent the brothers as envoys to the pontiff of the Christians, requesting him to send him a hundred men, learned in the various sciences and arts, to instruct his people. Niccolo, on his return, found his wife dead, but she had left him a son, Marco, who has been born soon after his departure.

The death of Pope Clement IV. and the long interregnum which followed, delayed the execution of Kublai Khan's commission, and they determined to return to Tartary, and to take young Marco with them. Gregory X. having been elected pope, appointed two Dominican friars to accompany them. They set out from Ptolemais in Syria in 1272, but the two friars declined prosecuting their journey, and the three Venetians proceeded alone through the regions of Central Asia. They reached the camp of Kublai Khan in 1275, where they met with a most favourable reception. Kublai was especially pleased with Marco, and he entrusted him with missions to various parts of China and India. Marco Polo was the first European who visited China Proper. On the marriage of a princess of Kublai's family with Argon, the sovereign of Persia, the three Polos obtained permission to form part of the escort appointed to accompany her to Persia. They set out in 1291, traversed China, embarked on the coast of Fo-kien, and sailed thence to Ormuz in the Persian Gulf. On landing they proceeded to Teheran, where they found that Argon was dead, and soon after, hearing also the news of the death of Kublai, the three Venetians determined to return home, and at last arrived at Venice in the year 1295. War was then raging between Venice and Genoa. Marco obtained the command of a galley forming part of the squadron commanded by Andrea Dandolo, which was defeated by the Genoese in the Adriatic. Marco was carried prisoner to Genoa. In his captivity he used to relate his adventures, and was eagerly listened to. He sent to Venice for the memoranda which he had taken down, and having made acquaintance with a fellow-prisoner of the name of Rustichello, a native of Pisa, who had been taken in the battle of Meloria, he dictated to him the narrative of his travels, and lent the MS. to read to the curious.

After peace was made between Genoa and Venice, Marco Polo returned home. His father, Niccolo, was still living, but he died in 1316. Of the latter period of his son Marco's life nothing more is known, except that he applied himself to correct and improve the text of his narrative, of which it appears that a French translation was made under his direction. The work is entitled, 'Marco Polo, delle Meraviglie del Mondo da lui descritte;' and in other copies, 'Delle Cose dei Tartari e dell' Indie Orientali.' It was inserted by Ramusio in his 'Raccolta di Navigazioni e Viaggi,' 3 vols. fol., Venice, 1550–59. But the best edition of Marco Polo is that by Count Baldelli, 4 vols. 4to., Florence, 1827, entitled 'Il Milione di Messer Marco Polo Veneziano,' with notes and illustrations, and a biography of Marco.

POLPERRO. [CORNWALL.]

POLTAVA, or PULTAVA, is a government of European Russia, lying between 48° 48′ and 51° 4′ N. lat., and between 30° 25′ and 36° E. long. It is bounded on the N.W. by Tschernigow, at the most northerly point by Kursk, on the N.E. by the Slobode of the Ukraine, on the S.E. by Ekaterinoslaf, on the S.W. by Kherson, and on the W. by Kiev.

This government is one continuous plain, with scarcely any irregularities of surface, except the elevated banks of the Dnieper and some other rivers. The principal river, towards which the whole country slopes, is the Dnieper, which however only flows along the western frontier, towards Kiev, Kherson, and Ekaterinoslaf, and is everywhere navigable. Its chief tributaries are the Trubesch and the Sula, with the Udai coming

from Tschernigow, the Psiol and the Worsikla from the Ukraine, and the Orel, which forms for some distance the frontier towards Ekaterinoslaf. The Sula and Psiol are navigable in the spring, are free from rocks, and flow through a rich country. There is no considerable lake in this government. The climate is mild; in winter however, when the cold north winds sweep over the open plains, the cold is severe. The summer is very hot. Little rain falls in the summer.

Of all the provinces of Little Russia, Poltava is the most fertile and the best cultivated. The soil is so rich that it yields ample crops without manure. All kinds of vegetables known in Russia thrive, even the more delicate kinds, such as asparagus, artichokes, and cauliflowers; fruits of all kinds abound. The steppes are covered with rich pastures, and the climate is so favourable that the cattle remain in the open air all the year round. In these steppes the magnificent ox of the Ukraine attains its extraordinary size; horses are bred in great numbers; and the Russian sheep appear in large flocks.

Though this fruitful province is so well peopled, very few hands are employed in manufactures. The inhabitants indeed manufacture articles of various kinds for domestic use. The chief articles of export are corn, flour, groats, brandy, linseed oil, hemp, flax, tobacco, honey, wax, wool, tallow, butter, horses, oxen, preserved fruit, and liqueurs.

The most important trading towns are Poltava, Krementschuk, and Romny. There are in all only twenty-two towns in this government, of which fifteen are the capitals of the fifteen circles: but the number of villages is not known; they are however very numerous, and though, for want of timber, the buildings are mostly of clay, they are kept very clean, both within and without; and the villages, being surrounded with orchards and gardens, have a very cheerful appearance.

The population in 1846 was about 1,783,800. The majority of the inhabitants are Little Russians, mixed however with a considerable number of Great Russians and some German colonists. At Krementschuk there are some Greeks and Armenians, and a few Jews. The Greek clergy are under the bishop of Poltava and Pereaslawl.

Poltava, the capital of the government, is situated in 49° 30′ N. lat., and 34° 15′ E. long., near the confluence of the rivers Poltawka and Worsikla. It is built of wood, but the streets are wide and straight; in the centre there is a good square surrounded with stone houses, and in the middle of it a handsome monument of granite, in honour of Peter the Great. It is surrounded by a rampart. Poltava has ten churches (including the cathedral), a convent, a gymnasium, and a school. The inhabitants, 10,000 in number, have considerable distilleries and tanneries, and carry on an extensive trade in the produce of the country.

The following are the other chief towns: Mirgorod, on the Khorol, has 7400 inhabitants, and holds great horse-fairs. Lubuyg, on the Sula, has 6000 inhabitants. Pereaslawl, at the confluence of the Alta and the Trubesch, has a great trade in cattle and corn, and 8000 inhabitants. Krementschuk, a well-built town, at the confluence of the Kaganlik and the Dnieper, has a considerable trade and a wool-fair, and 8000 inhabitants. Romny, or Romen, on the Sula, a small town, with not above 2000 inhabitants, is celebrated for its fairs, especially that held at the Ascension, where goods to the amount of more than fifteen millions of rubles are offered for sale.

POLYADE'LPHIA, the name given by Linnæus to the eighteenth class of his sexual system. The name alludes to the stamens being collected into several parcels.

POLYÆ'NUS was the author of a work called Στρατηγημάτικά, or Στρατηγήματα (Stratagems of War), in eight books. He lived about the middle of the second century A.D. He dedicated his work to the emperors M. Aurelius Antoninus and L. Verus. It is a collection of various warlike stratagems, apophthegms, and other matters, briefly told. The collection is useful as it contains extracts from many authors who are now lost. The best edition is by Corais, Paris, 1809. Polyænus was translated into English by R. Shepherd, London, 1793, 4to.

POLYA'NDRIA, the name given by Linnæus to the fourteenth class of his sexual system. The name is applied to those plants which have many stamens arising immediately below the ovary.

POLYA'NTHES TUBERO'SA, the Tuberose, is a tuberous-rooted plant highly prized for the delicious fragrance of its flowers, on which account it is cultivated in the warmer parts of both the old and new world. The tuberose is too tender a plant to be cultivated in England in the open air; but in the south of Europe it finds a climate suitable to it; and the Genoese supply the principal part of the European market with tubers for forcing.

POLYANTHUS, a garden variety of the oxlip primrose, with brown flowers, is one of those plants which have from time immemorial been favourites in gardens. It was probably obtained by accident, and is now propagated either by seeds or division of its root.

POLY'BIUS, the son of Lycortas, a distinguished Achæan leader, was born at Megalópolis, in Arcadia, probably about B.C. 204. It is said that Polybius was trained under Philopœmen, the greatest general of the Achæans. After the defeat of Perseus and the destruction of the kingdom of Macedonia, the Romans, not satisfied with having taken cruel vengeance on those Achæan states which they suspected of having secretly supported the cause of Perseus, made out a list of 1000 distinguished Achæans, and sent them to Italy to be tried. Polybius, who was one of the number, attracted the attention of Æmilius Paulus, who made him the instructor of his two sons Fabius and Scipio. Those young men, who became greatly attached to him, obtained permission for Polybius to remain at Rome. Polybius, in 150 B.C., succeeded, with the assistance of Scipio, in obtaining for the surviving Greek prisoners permission to return home. Polybius accompanied his friend Scipio in his military expeditions. He probably had already formed the design of writing his great historical

work, for which he prepared himself by a diligent study of Roman history, and travelling in Spain, Gaul, and other countries. When Scipio besieged and destroyed Carthage, B.C. 146, he was again accompanied by Polybius. After the destruction of Carthage, he hastened to the Peloponnésus, where a war with the Romans had broken out. But Corinth had already fallen, and all he could do for his unhappy country was to endeavour to obtain from the conquerors the mildest possible conditions. After the Roman commissioners had left Greece, in 145 B.C., he was appointed by them to regulate the affairs of the different states, a duty which he discharged to the full satisfaction of the Greeks. The remaining years of his life he seems to have applied to the revision and completion of his historical works. The time of his death is uncertain; but Lucian says that he lived to the age of eighty-two.

The great historical work of Polybius, in 40 books, consisted of two distinct parts, the first of which comprised a period of 53 years from the beginning of the second Punic war to the overthrow of the kingdom of Macedonia, including the immediate consequences of this event, that is, the pacification of Rhodes, and the sending of the 1000 Achæan prisoners to Italy. The second part began with the war in Spain against the Celtiberians and Vaccæans, and ended with the destruction of Corinth. The main object of Polybius was to show how the Romans within a short period acquired the dominion of a great part of the world; but, though Rome was the central figure in his history, the plan of the work comprised the history of all those people with whom the Romans came into contact. This history is one of those few works which the diligence, the impartiality, and critical judgment of the author have made a lasting monument. The work is intended to be practical, a work of political instruction. Polybius did not aim at, or he rather studiously avoided all, rhetorical embellishment. His style is far from being agreeable, and it requires some familiarity with this author to read him with ease. It may be owing to the work not being much read, that so much of it is lost. Only the first four books of the history are preserved entire. Of the remaining books we have only fragments and extracts. The edition of J. Schweighäuser, Leipzig, 1789-95, contained all the remains of Polybius which were known at that time. The recent edition of Bekker, Berlin, 2 vols. 8vo, contains all that is contained in Schweighäuser's edition, and also the discoveries of Mai in the Vatican Library. There are several English translations of Polybius: the most recent is that of Hampton, 2 vols. 4to, 1772, which has been reprinted in 8vo. Livy made use of the history of Polybius, and, as he does not often quote his authorities, it is probable that many parts of his work are founded on the authority of the Greek historian.

PO'LYBUS, or POLY'BIUS, a pupil and son-in-law of Hippócrates, who lived about the middle of the fifth century B.C., in the island of Cos. Several treatises, generally printed among the works of Hippocrates, are ascribed to Polybus.

POLYCARPON, a genus of plants belonging to the natural order *Paronychieæ*. *P. tetraphyllum* is a native of the coasts of the south-west of England, of Europe, and the Canary Islands. There are two other species of Polycarpon, *P. alsinefolium*, an inhabitant of Europe, the Cape of Good Hope, and Holland, and *P. peploides*, a native of Sicily and France.

POLYCARPUS, one of the fathers of the Christian church, and one of those distinguished by the term Apostolic Fathers, as having been contemporaries of some of the Apostles. The period of his death is well ascertained to have been in 167.

Of the writings of Polycarp only one small epistle remains. It is addressed to the Philippian church, exhorting them to the practice of their Christian duties and the maintenance of the purity of the faith. Polycarp suffered martyrdom at Smyrna during a general persecution of the Christians.

POLYCHROITE, the colouring matter of saffron, which consists of the dried stigmas of the flower of the *Crocus sativus*. This substance has a very deep yellow colour. By exposure to the air it absorbs moisture, and becomes viscid. Water and alcohol dissolve it readily.

POLYCHRO'MY, a modern term (from the Greek πολὺς and χρῶμα) used to express the ancient practice of colouring statues and the exteriors of buildings.

In Egypt it was at all times a universal custom to have recourse to colours in the decoration of architecture. As to the practice in Greece, it appears, from the remains of colour found upon ancient monuments, that the colouring was strictly confined to the ornamental parts—to the friezes, the metopes, and the tympana of the pediments. In later times amongst the Romans, in the times of Vitruvius and Pliny, the practice seems to have degenerated into a mere taste for gaudy colours, and to have been very general, as we see in the ruins of Pompeii, where however, occasionally, the Arabesque decorations upon the walls of the courts in the larger houses are very elegant.

Polychrome sculpture was quite as general amongst the Greeks as polychrome architecture; it is frequently alluded to by almost all the ancient writers, and many statues of this kind are minutely described by Pausanias. The acrolithic and the chryselephantine statues both come under this head. In the latter style were many of the most remarkable productions of ancient art: the Jupiter at Olympia, and the Minerva at Athens, by Phidias; the Juno, at Argos, by Polyclétus, and the Æsculapius, at Epidaurus, by Thrasymédes; and others described by Pausanias. In the flourishing period of Grecian art, custom seems also to have defined limits to this practice, for, except in the rudest ages, the figure itself was never painted, although it appears to have been sometimes covered with an encaustic varnish. That the naked marble of the works of the greatest sculptors was not coloured, we have most conclusive proofs from Lucian, in the dialogue between Lycinus and Polystratus. ('De Imag.,' 5-10.) The colouring was confined to the lips,

the eyes, the hair, the drapery, and the ornaments of the dress.

For further information on this subject the following works may be consulted :—Kugler, *Ueber die Polychromie der Griechischen Architectur und Sculptur und ihre Grenzen*; Semper, *Vorläufige Bemerkungen über bemalte Architectur und Plastik bei den Alten*; Stuart's *Athens*.)

POLYCLES. There were two sculptors or statuaries of Greece so called. The first lived about 370 B.C. The second was flourishing about 170 B.C. The works of this Polycles and of his brother Dionysius were carried to Rome with other monuments of Greek art. Pliny mentions that a statue of Juno, the joint production of these two sculptors, was placed in the temple of that goddess within the portico of Octavia. This Polycles, the pupil or scholar of Stadieus, according to Pausanias, made a statue of Amyntas, a pancratiast, or conqueror in the games, which was preserved at Olympia. Some statues of the Muses were also executed by Polycles.

POLYCLE'TUS, one of the most celebrated statuaries of ancient Greece. There were two artists of this name, one a Sicyonian, the more celebrated; the other a native of Argos and called Argivus.

Polycletus the Sicyonian was the scholar of Agéladas of Argos; and lived about the eighty-fourth Olympiad. There is an extensive list of the various admirable productions of Polycletus. Among his chief works may be mentioned the colossal statue of Juno which decorated the temple of that goddess at Argos, and which was considered in many respects to equal the finest productions of his contemporary and rival Phidias. It was chryselephantine, or covered with gold and ivory: all the naked parts being of ivory. This, taking it altogether, was considered his greatest work, though none, according to Pliny (xxxiv. 3), had a greater claim to notice than that which, for its excellence, was called the Canon, or rule of art. This was a statue so perfect in its proportions that artists referred to it, and were bound by it as by a kind of law. Polycletus is said by Pliny to have succeeded best in statues of a soft or gentle character. No work known to be the production of Polycletus exists. In addition to his fame as a statuary, Polycletus has that of an able architect.

The second Polycletus (Argivus) was the brother and scholar of Naucýdes. It is thought likely that this artist was the author of two celebrated statues described by Pausanias; namely, the Jupiter Philius, erected at Megalópolis, and the Jupiter Milichius, a marble statue at Argos, as well as of some bronze tripods dedicated at Amyclæ.

POLYCOTYLEDONOUS plants are those which have more than two cotyledons. Instances of this occur in the Brassicaceous order, in *Lepidium* and *Schizopetalum*, in the Boraginaceous order, in the genus *Amsinkia*, and especially in Coniferous plants.

POLYDORE VIRGIL. [VIRGIL, POLYDORE.]

POLY'GALA SE'NEGA, Virginian Snake-Root, a perennial plant, native of several parts of North America, but the best is found in Virginia, having a rootstock, about the thickness of a quill, twisted, and generally branched, the rootlets being esteemed the most powerful part. The bark is of a dirty yellow colour, the odour disagreeable, the taste at first mucilaginous, then sweet, then acid, but at last acrid, causing an unpleasant feeling of permanent irritation in the throat. It possesses very manifest stimulating and tonic powers, especially over all secreting organs, whether the skin, mucous membranes, or glands.

POLYGALA'CEÆ are polypetalous herbaceous plants, in which bitter qualities are predominant. Many of the species are sufficiently beautiful to be cultivated as objects of ornament.

POLYGAMOUS plants are those which have male and hermaphrodite, or female and hermaphrodite, or both female, male, and hermaphrodite flowers on the same or different individuals.

POLYGAMY is the name of the custom according to which a man may have more than one lawful wife at a time, which custom prevails in several countries. Polygamy has existed in Asia from time immemorial, and Mohammedanism adopted and confirmed the custom.

Neither Greek nor Roman usage allowed a man to have more than one wife at a time. But divorce became so common among the Romans, that the frequent change of wife became almost a practical polygamy. However, this practice of divorce was probably confined to the rich and luxurious, who, when they have no regular occupation, are generally the most licentious members of society. The barbarous nations, on the contrary, that is to say, those who were not Greeks or Romans, practised polygamy, with the exception of the Germans, 'who alone,' says Tacitus, 'among all the barbarians, are content with a single wife.' ('German.,' 17.)

In the scriptures we find many instances of polygamy recorded. In the time of our Saviour, no indication appears of its being common among the Jews. Divorce, however, was frequent, and our Saviour (Matthew xix. 9) reprobates the custom. St. Paul speaks always of marriage in terms implying the union of one man with one woman. In Christian countries, polygamy has been long since universally forbidden, both by the church and by the civil law. In England, it is a punishable offence. [BIGAMY.]

The Koran allows a man to have four legitimate wives; but it is only the rich who avail themselves of this permission. The Arabs are generally content with one wife.

POLYGA'STRICA, one of the two great divisions of Infusorial Animalculæ proposed by Ehrenberg, and adopted by many subsequent writers as a distinct class of the zoophytic division of the animal kingdom. [INFUSORIA.]

PO'LYGLOTTS (πολύγλωττα, from πολὺς, many, and γλῶττα, a tongue), books in several languages. The application of the word is restricted to the Bible, which, being a collection of books written by various persons, at various times, and on various subjects, is called Biblia (books), and a Polyglott Bible is therefore called Biblia Polyglotta.

The idea of a Polyglott Bible seems to have been first conceived in the third century, by Origen, who spent many years in forming the Old Testament into such a work. This is commonly called Biblia Hexapla, the Bible in six columns. The six columns consisted of 1, the Hebrew text; 2, the Hebrew in Greek characters; 3, the Greek version of Aquila; 4, the Greek version of Symmachus; 5, the Septuagint; 6, the Greek version of Theodotion. These six columns went through the work; but some portions were in eight columns and others in nine, and with reference to these portions it is called Octapla and Enneapla. Considered apart from the Hebrew, and the Hebrew in Greek characters, it is called Tetrapla, the Bible in four columns. Though two languages only were used in the formation of this work, it might not improperly be called a Polyglott. Except in the Septuagint, only a few fragments of Origen's performance have come down to us. These were published by Montfaucon, in 2 vols. folio, Paris, 1714, under the title 'Hexaplorum Originis quæ supersunt.'

Among the moderns, Aldus Manutius first planned a Polyglott in Hebrew, Greek, and Latin; but he never printed more than one sheet. Since that time various Polyglotts have been published, of which the principal are the following:—1. The Complutensian Polyglott. This was printed at Complutum, the Latin name of Alcalá de Henares, in Spain. It was begun in 1502, and finished in 1517, but it was not published before 1522, in 6 vols. folio. 2. The Antwerp Polyglott, printed by Christopher Plantin at Antwerp, 1569-72, in 8 vols. folio. The editor was Arias Montanus, who had about sixty assistants. The whole of the Complutensian Polyglott is comprised in the Antwerp Polyglott, besides other matter. 3. The Parisian Polyglott, printed at Paris by Antony Vitré, 1628-1645, in 16 vols. large folio. It contains all that the two other Polyglotts contain, and also an Arabic version of the Old and New Testament, a Syriac version of the former, and the Samaritan Pentateuch. 4. The London Polyglott. This was edited by the learned Brian Walton, afterwards bishop of Chester. It is in 6 vols. large folio. It was published by subscription, and the volumes came out in the following order:—the first volume in September, 1654; the second in July, 1655; the third in July, 1656; and the last three in 1657. Some portions of this Polyglott are printed in seven languages, all open at one view. No one book is given in nine languages; but nine languages are used in the course of the work, namely, Hebrew, Chaldee, Samaritan, Syriac, Arabic, Persian, Ethiopic, Greek, and Latin. A vast body of introductory matter is in the first volume, and the sixth is made up of various readings, critical remarks, &c. Brian Walton was assisted by a number of men who formed a constellation of oriental and general scholars, such as perhaps have appeared together at no other period during the whole history of our country. One of these men was Dr. Edmund Castell, who published his 'Lexicon Heptaglotton' in 1669, 2 vols. folio. This is a lexicon of the seven oriental languages occurring in Walton's Polyglott, and it has grammars of all these languages prefixed. Walton's work is by no means equal in appearance to the three preceding Polyglotts, but in point of solid usefulness it is far beyond any one of them. 5. Bagster's Polyglott. This work was published by the enterprising bookseller by whose name it is known, in 1 vol. folio, London, 1831. The Old Testament is in eight languages, and the New Testament in nine. Eight languages are exhibited at once upon opening the book. The languages are Hebrew, Greek, English, Latin, German, Italian, French, Spanish, and Syriac, the New Testament being given in the last language as an appendix. To these are added the Samaritan Pentateuch in Hebrew characters; the notes and readings of the Masorites; the chief variations of the Vatican text of the Septuagint (which is followed in this Polyglott), and of the Alexandrine as given by Grabe, Oxford; and of the Greek Testament the whole of the selected various readings given by Griesbach in his own edition of 1805. The types are small, but clear and elegant, and the paper is of excellent quality.

POLYGNO'TUS, one of the most celebrated of the ancient painters, was a native of Thasos; son and pupil of Áglaophon. It would seem probable that he flourished at Athens at least as early as the 80th Olympiad (B.C. 460). Pliny describes him as 'the first who painted women with transparent drapery, and covered their heads with variegated caps. He first began to open the mouth, and show the teeth of his figures, and to give them an expression of countenance different from the ancient stiffness.' (Plin. xxxv. 9.) Cicero mentions him as one of the masters who used the four old colours. Aristotle also mentions him with praise ('Polit.' viii. 5, and 'Poetics,' 15).

The principal works of Polygnotus enumerated by the ancients are—1. The pictures in the Lesche at Delphi, of which Pausanias has left an elaborate description. The subjects were—the Capture of Troy, the Return of the Greeks, and the Visit of Ulysses to the Shades. 2. The Poécile at Athens. The subject probably was the Destruction of Troy. 3. A painting in a building near the Propylæa at Athens. 4. The Marriage of the Daughter of Leucippus in the temple of the Dioscúri at Athens. 5. A picture representing Ulysses after the Slaughter of the Suitors, in the temple of Minerva Area at Platæa. 6. The Walls at Thespiæ, painted by Polygnotus and restored by Pausias. It seems likely that Polygnotus painted the temple of Theseus.

PO'LYGON and POLYHEDRON. The word polygon means figure of several angles, and polyhedron means solid of several faces: the first is used for a plane bounded by straight lines, the second for a solid bounded by planes.

POLYGONA'CEÆ are apetalous plants with triangular fruit. The order consists of herbaceous plants more frequently than of shrubs, and a large part of them are mere weeds; as for example our docks, and wild polygonums. Some however are handsome flowers; others are valuable for cooking, as the rhubarb, whose roots also furnish the important tonic and purgative drug of that name;

and in some a great quantity of astringent matter is found, as in the *Coccoloba uvifera*, or Seaside Grape of Jamaica, from which a kind of Kino has been prepared.

POLY'GONUM, a genus of plants belonging to the natural order *Polygonaceæ*. *P. Bistorta*, Great Bistort, or Snake-Weed, is one of the most powerful vegetable astringents; its root contains tannin and gallic acid in abundance. *P. amphibium* is a native of England, in ponds, ditches, and wet places. It is a fine showy plant, but one of the most difficult to eradicate from lands recovered from rivers, or drained lakes and marshes. The subaquatic stems root at every joint, and extend to a surprising length, rising through the soil. *P. hydropiper*, the Water-Pepper, is a hot acrid plant, and is reputed to be a powerful diuretic, but it loses its activity by drying, and therefore requires to be used in a fresh state. It dyes wool of a yellow colour.

There are many other species of Polygonum, natives of Great Britain and other parts of the world. *P. tinctorium* is cultivated in France and Flanders on account of the fine blue dye extracted from it. The seeds of *P. barbatum* are used in medicine by the Hindoo practitioners. The leaves of *P. hispidum* are said by Humboldt to be substituted in South America for tobacco; and *P. anti-hæmorrhoidale* is esteemed in Brazil on account of its astringency, in baths, poultices, &c. The juice, as well as an infusion of the ashes when burned, is employed by the Brazilians in the clarification of syrup and the crystallisation of sugar.

P. Fagopyrum, the Buck-Wheat, is now referred to *Fagopyrum esculentum*. [FAGOPYRUM.]

POLYHALLITE, a reddish, opaque, fusible, soluble mineral, composed chiefly of the sulphates of lime, potash, and magnesia.

POLYHEDRON. [POLYGON and POLYHEDRON.]

POLYHISTOR, ALEXANDER, a native of Cotyæum in Phrygia, according to some, and of Miletus according to others, was a geographer and historian, who was taken prisoner by the Romans in the war of Sulla against Mithridates, and carried to Rome. He was manumitted by Cornelius Lentulus, who purchased him. He is often quoted by Pliny the Elder and others as a man of great learning, from which circumstance he received the name Polyhistor. Of his work in forty books, each of which treated of a separate country, nothing remains.

Polyhistor is also the title of a work in Geography by Solinus. [SOLINUS.]

POLYMIGNITE, *Titaniate of Iron, Zircon*, &c., is a right rhombic prismatic crystal, blackish, opaque, and infusible. One-half of its weight consists of titanic acid.

POLYNE'MUS, a genus of fishes, placed by Cuvier in his third division of the *Percidæ*, the species of which are distinguished by the ventral fins being inserted farther back than the pectorals. These fishes are further distinguished by having several long filaments beneath the pectoral fin; these are, in fact, free rays of that fin. Their teeth are minute and dense as the pile on velvet, or recurved like the teeth in a carding-machine; they are found on both jaws, as well as on the vomer and palate. The general form of the body of the *Polynemi* somewhat resembles that of the perch. The muzzle projects over the mouth; the eyes are rather large, and placed very forward; the dorsal fins are short and widely separated, and the caudal fin is large, and more or less forked. The scales extend on the fins, as in many of the *Sciænidæ*, which these fishes appear to approach in some other characters.

Considerable interest is attached to the *Polynemi* on account of some recent discoveries, which tend to show that they produce isinglass in considerable abundance.

The attention of the members of the Zoological Society was first directed to this subject by Dr. Cantor. 'In the December number (1838) of Parbury's 'Oriental Herald,' says this naturalist, 'appears a letter 'on the Suleah Fish of Bengal, and the isinglass it affords.' This fish, says the anonymous writer, when at its full size, attains about four feet in length, and is squaliform, resembling the shark species in appearance, but exhibiting a more delicate structure. The meat of this fish is exceedingly coarse, and is converted by the natives, when salted and spiced, into 'burtah,' a piquant relish, well known at the breakfast-tables of Bengal. The bladder of the Suleah may be considered the most valuable part of it; this, when exposed to the sun and suffered to dry, becomes purely pellucid, and so hard that it will repel the edge of a sharp knife when applied to it. These bladders vary from half a pound to three-quarters of a pound avoirdupois in weight when perfectly dry. This fish abounds in Channel Creek, off Saugor, and in the ostia, or mouths, of all the rivers which intersect the Sunderbunds, and are exceedingly plentiful in certain seasons. ('Zoological Proceedings,' July, 1839.)

POLYNE'SIA, a geographical term signifying 'many islands,' under which some continental geographers proposed to include the continent of Australia and all the islands in the eastern seas and in the Pacific from Sumatra to the western coast of America, between 35° N. and 56° S. lat., and between 94° E. and 105° W. long. To this immense space on the earth's surface French geographers now apply the name of *Oceania*, which they divide into Malasia or Western Oceania, comprehending Sumatra and other Indian islands north of Australia as far as the Philippines inclusive; Central Oceania, which comprises Australia, New Guinea, New Zealand, and the islands in their immediate vicinity; and Polynesia or Eastern Oceania, which comprehends all the other islands in the Pacific from the south of Japan and the east of the Philippines to the island of Sala, the most eastern of the Polynesian Islands. In this latter acceptation Polynesia is now generally used.

POLYNOMIAL, an algebraical word, meaning an expression which has several terms.

POLYODONTA ('Many-Toothed Tribe'), a name applied by Lamarck and M. de Blainville to the *Arcacea* of the former, the *Ark-Shells*, &c., of collectors, comprehending the forms collected by

Linnæus, in his 'Systema Naturæ,' under the genus *Arca*, and those designated by more modern zoologists as the genera *Arca*, *Cucullæa*, *Pectunculus* and *Nucula*.

Lamark's *Arcacea* constitute a part of his *Conchifères Ténuipèdes*, and are arranged by him between the *Cardiacées* and the *Trigonées*.

De Blainville places his family *Polyodonta* or *Arcacés* between the *Mytilacea* and *Submytilacea*.

Lamarck thus defines the family:—'Cardinal teeth small, numerous, entering, and disposed in each valve in either a straight, a curved, or a broken line.'

M. Deshayes remarks, in the last edition of Lamarck, that the greater number of conchologists consider the family to be very natural, and not requiring any alteration, the relationship between the genera being apparent, and especially between *Cucullæa*, *Arca*, and *Pectunculus*; whilst the differences existing between them are of so little importance that their union under one natural genus may be well adopted. *Nucula* indeed does not appear to M. Deshayes to be so well connected with the preceding genera; for the *Nuculæ* are nacreous, a condition not observed in the others. The hinge teeth, too, of the *Nuculæ* have a different form, and they are in general more projecting than those of the *Arcæ* and *Pectunculi*; the position of their ligament distinguishes them still further. In the three preceding genera the ligament is external, and rolled up, as it were, behind the hinge; in the *Nuculæ* it is internal, and received into a small spoon-shaped cavity placed in the angle formed by the cardinal hinge. It is true, says M. Deshayes, in continuation, that among the *Nucula* are comprehended many species in which the ligament is external as in the *Pectunculi*, and these species are not nacreous. M. Deshayes suggests that it may be convenient to withdraw these species from the genus *Nucula*, to place them among the *Arcæ* and the *Pectunculi*, and thus separate them from the family of the *Arcadæ*, which family would be then well characterised by the position of the ligament and the nature of the hinge. He further, with reference to the figure published by M. Quoy, in the 'Voyage of the Astrolabe,' of the animal of a *Nucula* placed beneath that of a *Trigonia*, acknowledges that there is no denying that more analogy exists between them than had been at first supposed; but he also says that it is necessary to remark that the animal of the *Nucula* represented belongs to a species which has an external ligament, and which by that very organisation approaches the *Trigoniæ* more than the others.

The fossil species of *Arcadæ* or *Acacea* are numerous; they occur in the greensand and inferior oolite, in the chalk marl, coralline oolite, lower greensand (Kent and Sussex), upper greensand (Isle of Wight), and in other tertiary strata.

POLYPE. The discoveries of Trembley, regarding the structure and animal functions of the *Phytoïd Hydræ*, and *Plumatellæ* of fresh water, opened a new field of research into the nature and relations of many neglected forms of life, and gave occasion for much correct inference and baseless conjecture. Borrowing from Aristotle and Pliny the term Polypus, by them applied to a cephalopod, the systematic naturalists who followed Linnæus collected under this title many really animalised masses in the form of plants, and after abundant examinations by Ellis and others of the membranous, horny, or stony 'fulcra,' bases, or axes, which remain after desiccation or decay of the softer parts, generally agreed in opinion that to all these plant-like bodies were associated active living animals like the Hydræ described by Trembley.

As in a tree the flowering and reproductive organs manifest more active and varied functions than the general mass of bark and wood which serves to unite them in one common life, so in these Zoophyta the little Polypi expanding from their cells for food, light, or aëration, and shrinking back upon the agitation of the water or withdrawal of the light, seemed like so many animal flowers, which might be studied apart from the Polypiaria which they adorned. They were in fact studied apart, and unfortunately attention was more directed to the wonderful permanent fabric, or 'Polypidom,' as Lamouroux calls it, than to the Polypi themselves. Hence the imperfection of all the schemes of classification for this portion of the Zoophytic division of the animal kingdom, and many of the erroneous generalisations and hypotheses regarding the lower forms of animal life. There was besides a real impediment in the way of accurate and satisfactory observation of these minute parts of creation in the imperfection of microscopes. Until Amici, Chevalier, Pritchard, and Plösl, gave us powerful reflecting and achromatic engines, it was vain to look for stomachs in the Polygastrica and a variety of internal organisation in the Polypi of the so-called 'sea-weed.'

One of the most interesting disquisitions on the Polypean races—that of Lamarck ('Anim. sans Vertèb.,' tom. i.) fixed for these animals the characters of gelatinous contractile body; alimentary canal with a single opening surrounded by ciliæ or tentacula; reproduction by gemmæ, internal or external; organs of sense, respiration, or fecundation, none; often associated into compound existence. If to these definitions we add the notion of extraordinary tenacity of life, manifested by the survival and multiplication of *Hydræ* under the knife, the surprising fact ascertained in the *Hydra* by Trembley of the external surface taking up the function of digestion when the animal was turned inside out, the varieties of gemmiparism observed in *Sertularia*, *Cellaria*, &c., by Ellis and others, and the employment of the tentacula or ciliæ around the mouth, we shall see the state of this branch of zoology in the time of Lamarck.

POLYPIA'RIA. In subdividing the Linnæan Zoophyta, naturalists have generally recognised the propriety of separating in one distinct class the compound, plant-like, generally polypiferous animals. Lamarck, Lamouroux, and Cuvier agree in this. Blainville's system of classification employs the term Polypiaria for one of several related classes (procured by dismemberment of Lamarck's *Polypi*), and divides it into four important subclasses, viz. *Polypiaria solida*, *Polypiaria membranacea*, *Polypiaria dubia*, *Polypiaria nuda*.

The active animal parts of the Polypiaria of Blainville are generally of slender figure, provided with filiform tentacula in one row, and either nude or contained in cells of various form and substance, but never lamelliferous, agglomerated together.

The subclasses are thus defined:

Polypiaria solida. — Animals contained in small calcareous cells, with a terminal opening accumulated into a solid fixed polyparium. Ovaria internal? Fam. 1. *Milleporidæ.* Fam. 2. *Tubuliporidæ.*

Polypiaria membranacea.—Animals very short, urceolated, provided with many tentacula (often ciliated) in one row, contained in membranous, rarely calcareous, adherent cells, with a more or less bilateral opening. Ovaries external. Fam. 1. *P. operculifera.* Fam. 2. *P. cellariæa.* Fam. 3. *P. sertulariæa.*

Polypiaria dubia.—Animals urceiform, provided with long (often ciliated) tentacula, arranged in a curvilinear form above and around the opening of the mouth, and springing from a common membranous basis.

Polypiaria nuda.—Body gelatinous, very contractile, free, excavated into a gastric cavity, of simple form, provided at its entrance with cirrhose tentacula; no trace of viscera; reproduction by external germs.

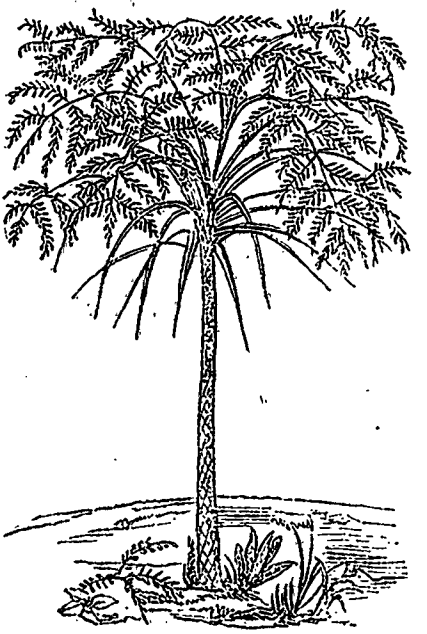
For an account of the genera of these oceanic zoophytes (often by the indiscriminating observer regarded as sea-weeds), see Lamarck, De Blainville, Milne Edwards, Lonsdale, Lamouroux, Ellis, and others. As common examples we may notice the *Flustra*, a frondescent Zoophyte, washed upon the shore in abundance by the tidal waves, and *Sertularia* and *Thuiaria*, delicately frondescent, or rather branched, each plumelet being studded with cells tenanted by polypes. The observer should use a good glass in examining these lower forms of animal organic structure, when he will discover cells arranged in the most elegant order.

POLYPODIA'CEÆ are one of the chief divisions of the natural order of Ferns, and may be conveniently taken as the type of the whole. They constitute the highest form of Acrogenous or Cryptogamic vegetation, and are regarded as approaching more nearly to Cycadaceous Gymnosperms than to any other part of the vegetable kingdom now in existence.

They are usually herbaceous plants, with a permanent stem which either remains buried beneath the soil, or creeps over the stems of trees.

The stems seem always to produce roots in great quantities from their surface, even when elevated in the air. Such roots are more especially met with near and under the ground, where they form a stratum of some thickness, acting both as feeding organs and as an external protection. On all Tree-Ferns they appear upon the stem at least in the form of tubercles; and in *Cibotium Billardieri* they cover over the whole surface from the top to the bottom with a dense layer several inches deep.

Although Tree-Ferns are unknown in any countries except those having either a damp tropical climate, or at least an equable mild temperature and humid atmosphere, yet the common ferns of this country, whose stems, vulgarly called roots, are formed under ground, exhibit the same kind of organisation as that just described, only in a less conspicuous manner. In those tropical lands where the Tree-Fern acquires its full size, as for example Brazil, the Philippines, Pitcairn's Island, &c., it becomes one of the most majestic and graceful objects, having an enormous plume of the most delicate and verdant foliage at the extremity of a lofty flexible stem, which sways beneath the gentlest breeze.



Tree-Fern (*Chnophora excelsa*).

The leaves of ferns, called their fronds by Linnæus, are inserted upon the stem by an angular base, which is never extended at the sides into a sheath, as in palms: they are often of very considerable size, and cut into a multitude of divisions by repeated pinnation, and this is especially the case with those of Tree-Ferns. The leaves are however often very small, and undivided. Their surface is provided with stomates, or breathing pores.

The fructification of ferns consists of hollow cases, called *sporangia*, generated upon the surface of the under side of the leaves, or below its epidermis, which latter is then ruptured in a definite manner, and the portion so divided from the rest is called the *indusium*.

POLYPODIUM. [FILICES.]

POLYPO'GON, a genus of grasses belonging to the tribe *Agrostideæ*. *P. monspeliensis* is a very beautiful grass, and is a native of Great Britain in salt marshes. *P. littoralis* is a British species, and is found in muddy salt marshes.

POLYPUS is a morbid growth attached to the interior of one or other of the mucous canals, by a

more or less narrow pedicle. Polypi occur most frequently near the orifices of external communication of the mucous canals, as in the uterus, the fauces, the larynx, and the nose.

Polypi are of four kinds, which are named respectively, vesicular, gelatinous, fibrous, and malignant. *Vesicular Polypi* are gray or yellowish transparent vesicles, containing a clear watery fluid with a little mucus; they are very soft, easily break down when they are pressed, and are liable to considerable increase of size when the evaporation from them is decreased in damp weather. They appear to consist of enlarged mucous follicles. *Gelatinous Polypi* are more solid growths, consisting of dull white masses attached to the mucous membrane of the nose, and themselves covered by a fine but rather tough membrane. They seem composed of an excessive growth of the mucous membrane infiltrated with fluid, and having a few fibres running through its substance. *Fibrous Polypi* are still more solid growths: they consist of a dense fibrous and vascular tissue, which it is often difficult to cut through, and which is sometimes converted into bone. They are usually intimately connected with the deeper parts of the mucous membrane. *Malignant Polypi* are growths of a cancerous nature from the mucous membrane, which have received the name of polypi rather from having the same situation as the preceding than from their similarity of form. They may assume the characters of simple or scirrhous cancer, but more commonly they have those of the soft or medullary variety, which is frequently called *Fungus Hæmatodes*.

The first of the polypi here described is usually dependent on decayed health, and will yield to medical treatment. The other kinds can only be removed by operations, in some cases difficult and dangerous.

POLYTHALAMA'CEA. [CEPHALOPODA.] The leading groups of the Polythalamaceous Cephalopods may be ranked in the following four families, viz.:—

Tetrabranchiata.	Fam. 1.	*Nautilidæ.*
	2.	*Ammonitidæ.*
Dibranchiata.	Fam. 1.	*Spirulidæ.*
	2.	*Belemnitidæ.*

So large a proportion of the components of these families are in a fossil state, that it is necessary to base a view of their relations on the conservable testaceous parts principally, always however keeping in mind the probable uses of the parts, as determined by investigation of the recent forms most nearly comparable.

Taking a general view of the distribution of the *Polythalamacea*, we find—

In a living state, *Spirulidæ* and *Nautilidæ*.

In the tertiary series, some of the *Nautilidæ*.

In the cretaceous strata, and in the oolitic strata, *Nautilidæ, Belemnitidæ, Ammonitidæ*.

In the saliferous strata, *Nautilidæ* (not including *Orthocerata*), *Ammonitidæ* (of the type called *Ceratites* only).

In the carboniferous strata, *Nautilidæ*, including *Cyrtocerata, Orthocerata, Ammonitidæ* (of the type called *Goniatites* only).

In still lower strata, *Nautilidæ* (including *Cyrtocerata, Phragmocerata, Orthocerata*, and *Clymeniæ*), *Ammonitidæ* (of the type of *Goniatites* only).

Finally, in strata lower than these, as the Snowdonian slates, where shells and Polypiarian remains occur, none of the *Polythalamacea* are known.

PO'LYTHEISM (πολὺς, much, many, θεὸς, a god), the doctrine or worship of a plurality of gods. This form of the word is not found in Greek writers.

Polytheism differs from idolatry in this respect:—the former refers to a plurality of gods, without including necessarily the notion of forms, real or imaginary; the latter refers either to one god only, under some one visible form, or to any number of gods, under as many visible forms.

The notion of a plurality of gods existed very early, as we see from the Pentateuch; and it assumed a great variety of forms. Egypt was the country in which it existed in the most monstrous shape. The Greeks and Romans, at least in the popular creed, were polytheists, though they respectively acknowledged a supreme god, under the name of Zeus and Jupiter. Yet the supreme god is himself represented as under the dominion of Fate. The origin of polytheism appears to be a superstitious fear or regard for the heavenly bodies and the great powers of nature—the sun, the moon, the stars, fire, earth, and water; which perhaps were first viewed as the representatives of the Deity, and then the adoration was transferred from the Creator to the things which he created. The transition was easy to the deification of departed persons, and even animals which were either noxious or beneficial. Polytheism still exists in many parts of the world, but only among ignorant and uncivilised nations.

POMBAL. [ESTREMADURA, *Portuguese.*]

POMBAL, MARQUIS DE. *Dom Sebastiao José de Carvalho*, Count d'Oeyras and Marquis de Pombal, was born in 1699, at Soura, a village in the territory of Coimbra, of an old and noble family. He first studied for the bar; then entered the army, but left that also, and remained in private life till 1739, when he was sent ambassador to London, and afterwards in the same capacity to Vienna, where he married the Countess Daun, through whose influence with her countrywoman, the dowager queen and mother of Joseph I., he was raised to the administration of foreign affairs in Portugal.

After Carvalho's promotion, which took place in 1750, Portugal may be said to have been regenerated. He favoured the establishment of manufactures, and encouraged printing and agriculture; he gave to the university of Coimbra a new system of studies; he introduced into Brazil the cultivation of coffee, sugar, cotton, rice, indigo, and cocoa; he created the companies of Pernambuco, Pará, and Maranhno; and established so strict a police in the kingdom, that even idlers were not allowed to promenade the streets. He also checked the power of the Inquisition, and banished the Jesuits from the Portuguese dominions. But his unremitting persecution of the nobility, and his merciless conduct towards

the family of the Tavoras, dimmed the brilliancy of his reputation.

On the death of Joseph I. the queen ordered him to retire to Pombal, where he died in the eighty-first year of his age. The finest parts of Lisbon were built according to his designs after the earthquake.

POME, in botanical language, signifies a fleshy inferior many-celled fruit, such as that of the apple, pear, &c. It differs from a berry in its seed not being buried in pulp.

POMEÆ, a section or sub-order of the natural order of *Rosaceæ*, including *Cratægus*, *Raphiolepis*, *Chamæmelis*, *Photinia*, *Eriobotrya*, *Cotoneaster*, *Amelanchier*, *Mespilus*, *Osteomelis*, *Pyrus*, and *Cydonia*.

The species of the genus *Raphiolepis* are known by the name of Indian Hawthorns. They are natives of various parts of Hindustan and China. The genus *Chamæmelis* was constructed by Lindley for a single species, *C. coriacea*, which is found in the island of Madeira. The species of the genus *Photinia* are evergreen trees. They require the same treatment as the species of Cratægus, and are eminently ornamental. *P. serrulata* is native of Japan and China. It has been long cultivated in Great Britain as a standard in the open air in warm situations. Where it is too cold to grow it as a standard, it may be placed against a wall. The species of *Eriobotrya* are less hardy than those of the last genus. They are small trees, attaining a height of from 10 to 20 feet, and native of China and Japan. *E. Japonica* is the common Loquat. The fruit is of a middling size, pear-shaped, yellow, downy, and disposed in large pendulous branches. It resembles the apple, and is said to be as good as that of the mango. *Amelanchier* is another genus separated by Lindley from the old genus *Mespilus*. The species are small trees, natives of Europe and North America. They are cultivated in British gardens on account of their early white showy flowers. *A. vulgaris*, the Common Amelanchier, is a native of mountainous woods among rocks, in many parts of the continent of Europe. It has been in cultivation in England since the year 1596. *A. botryapium*, the Grape-Pear, is a shrub or low tree in this country, but in its native districts in Virginia and Canada, in America, it reaches a height of 30 or 40 feet. The fruit is of a purplish colour, and ripens in June. It has an agreeable sweet taste. *A. sanguinea*, *A. ovalis*, and *A. Florida*, are other species cultivated in this country. The *Pyrus anthyllidifolia* of Sir J. E. Smith has been made into the genus *Osteomelis* by Lindley. At present this is the only known species. It is a shrub, native of the Sandwich Islands. The species of *Cydonia* yield the fruit called the Quince. Independently of this recommendation, they are very useful as stocks for other species of Pomeæ, and are deserving a place in every ornamental plantation. *C. vulgaris*, the common Quince Tree, is most frequently cultivated, and several varieties are described.

POMEGRANITE. [PUNICA.]

POMERANIA (in German, *Pommern*), one of the eight provinces of the Prussian kingdom, is situated between 52° and 54° N. lat., and 12° 30′ and 18° E. long. It is bounded on the N. by the Baltic, on the E. by West Prussia, on the S. by Brandenburg, and on the W. by Mecklenburg. It is a long tract of coast, extending 200 miles on the Baltic, and varying in breadth from 30 to 80 miles. The area is 12,000 square miles, and it is divided into the three governments of Cöslin, Stettin, and Stralsund.

Pomerania is one of the lowest and flattest countries in Germany; only a few hills of a moderate height break its continuous level. The soil consists of sand, mixed in some places with clay. The province is crossed in its broadest part by the Oder, which, flowing through a marshy tract, divides into many arms or channels, one of which, the great Regelitz, forms, towards its mouth, the Great Dammer Lake, and, together with the main stream, falls into the extensive inland water, the Frische Haff, the eastern part of which is called the Great Haff, and the western the Little Haff. The water of the Haff is fresh, and it is only during the prevalence of the north wind that it is rather brackish, and considerably higher, owing to the influx of the sea. The two great islands of Usedom and Wollin separate it from the Baltic, with which it is connected by three outlets. The other rivers of Pomerania are the Ucker, Peene, and Ihna. There are many small lakes: that of Madine, which is celebrated for its lampreys, is one of the largest.

The climate of Pomerania is cold, and the weather is changeable: storms on the coast are not uncommon. The natural productions of the country are—horses, horned cattle, sheep, goats, swine, small game, domestic poultry (especially geese), sea and river fish, and bees; corn, peas, and beans, potatoes, fruit, timber, flax, and tobacco; alum, bog-iron, salt, turf, and amber. The Pomeranian forests are very extensive and productive. The fisheries likewise yield a considerable profit. There are no manufactures of much importance. Good and strong linen however is made, and is a considerable article of exportation. What manufactures there are, are confined to the principal towns. [STARGARD; STETTIN; STRALSUND.] The trade of this province is very important.

The inhabitants are by descent partly Sclavonians and partly Germans. The nobles are numerous, chiefly consisting of German families who have settled here since the 12th century. The vassalage of the peasants was abolished by Frederick William III. The population in 1846 was 1,165,073, of whom nearly all are Lutherans.

Pomerania was formerly a considerable part of the ancient kingdom of the Wends, or Vandals. From the year 1062 it had its own dukes. The Christian religion was introduced in the 12th century. The line of the dukes became extinct on the death of Boleslaus XIII., in 1637. On the death of the last duke, Pomerania was divided between Prussia and Sweden; and it was not until 1815 that the former state obtained possession of the whole of Pomerania, by certain arrangements with Sweden and Denmark.

POMFRET, JOHN, was born in 1667, at

Luton in Bedfordshire. He studied at Queen's College, Cambridge, where he was admitted B.A. in 1684, and M.A. in 1698. Having entered into orders, he obtained the rectory of Maldon in Essex. His poems, published in 1699, had once many readers, especially 'The Choice,' but they are now deservedly neglected. Pomfret died in 1703.

POMMERN. [POMERANIA.]

POMONA, or MAINLAND. [ORKNEYS.]

POMPADOUR, MADAME DE. [LOUIS XV.]

POMPEII, an ancient town of Campania, situated about 13 miles south-east from Naples, in a plain at the foot of Vesuvius, through which runs the little river Sarno. Pompeii, as well as the neighbouring town of Herculaneum, is said by Strabo (p. 247) to have been originally possessed by the Osci, and then by the Tyrséni and Pelasgi. It afterwards fell under the power of the Greek colonies of Cumæ and Parthénope, and lastly of the Samnites (about 440 B.C.), who made themselves masters of this coast as far as the river Sílarus. About eighty years later the inhabitants of Campania threw off the yoke of the Samnites, and placed themselves under the protection of Rome. In the Social War (90 B.C.) the Campanian towns revolted, and Pompeii, among them, joined the Marsian Confederacy. In the year A.D. 79, in the month of August, the first recorded eruption of Vesuvius took place, which is described in a letter of the younger Pliny. In this eruption Pompeii was buried under showers of stones, cinders, and ashes, which, in course of time, became a bed of earth, and corn was sown and the vine planted over the buried town. In 1755 the excavations began, which have been continued at intervals, and have brought to light a considerable part of the city of Pompeii, consisting of houses, two theatres, temples, and other buildings. The statues, medals, and other movables found in the ruins have been placed in the Royal Museum of Naples, and are described in the work entitled 'Museo Borbonico,' published at Naples.

A description of the remains of Pompeii is contained in the work entitled 'Pompeii' in the 'Library of Entertaining Knowledge;' but for full information the reader must refer to the elaborate works of Mazois, Sir William Gell, and Donaldson.

POMPEIUS, CNEIUS, commonly called Pompey the Great, was born on the 30th of September, 106 B.C., a few months after the birth of Cicero. He was six years older than Cæsar. His family was plebeian, but his father, Pompeius Strabo, joined the aristocratic party, and fought under their banner in the Marsic war. The son served first in the Marsic war. After his father's death, his house in Rome was plundered by the party of Marius. When Sulla was returning from the war against Mithridates, Pompeius was raising troops at his own cost in Picénum, with the intention of opposing the party of Marius. He defeated M. Brutus, one of the commanders on the side of Marius, and two others retreated before him. All the towns of Picenum received him as their deliverer. The senate were dissatisfied at his acting without their authority, but his army was faithful to him. He joined Sulla, who treated him with the respect which his success entitled him to and his arrogant temper claimed. He was at this time only twenty-three years of age. Sulla was made dictator, and the civil war still continued, during which Pompeius distinguished himself. After the fall of Prænestè, Sulla gave his step-daughter Æmilia in marriage to Pompeius, though she was then pregnant by her husband M. Glabrio, who was compelled to part with her, and Pompeius put away his own wife Antistia. Pompeius afterwards commanded in Sicily, and, when Carbo was taken and brought to him, Pompeius put him to death, and sent his head to Sulla. From Sicily Pompeius passed over into Africa to oppose Domitius Ahenobarbus, whom he defeated. He also restored King Hiempsel, a friend of Sulla, to the throne of Numidia. After this success, which was the work of a few months only, Pompeius returned to Rome, where he was saluted by Sulla, it is said, by the name of Magnus, or the Great. Though he had held no public office, and was still only an Eques, he claimed a triumph, which he obtained, though Sulla was at first averse to allow it. A coolness ensued between Sulla and Pompeius, who, in spite of Sulla's remonstrances, used all his influence to secure the election of Æmilius Lepidus to the consulship. After Sulla's death (B.C. 78) Lepidus attempted to get the laws repealed which were enacted under Sulla's dictatorship, but Pompeius successfully resisted him. After the expiration of the consulship of Lepidus and Catulus, a civil war broke out, and Pompeius was sent by the senate to oppose a division of the army of Lepidus in Cisalpine Gaul, which was under the command of M. Junius Brutus. Brutus, after defending himself in Mútina, surrendered, and Pompeius ordered him to be put to death. Lepidus himself was defeated by Pompeius and Catulus near Cosa, and he died soon after. After the defeat of Lepidus, Pompeius still kept his command, under various pretexts, though the senate had ordered him to lay down his arms; but he soon obtained a legitimate sanction of his ambitious views by being sent to oppose Sertorius in Spain (B.C. 76), with the authority of proconsul. The Spanish war was continued with various success until B.C. 72, when Sertorius was assassinated by his own adherents, and Perperna, one of the assassins, took the command of the Spanish forces. Perperna was defeated and taken prisoner, and met with the death which he deserved. Metellus, who had served in Spain both before Pompeius came and afterwards, left Spain after the defeat of Perperna, and Pompeius had the credit of settling the administration of the country.

While Pompeius was on his road through Gaul to Italy, the war against the revolted slaves and Spártacus had just been terminated by Crassus, but Pompeius had the opportunity of cutting to pieces a body of slaves who were seeking refuge beyond the Alps, and he claimed the merit of finishing this dangerous war. Though he was not at Rome, Pompeius became a candidate for the consulship, and as he had not held any of the

minor civil offices, and could not legally be a candidate for the consulship, the senate suspended the laws in favour of Pompeius, and he and Crassus were elected consuls for the year 70 B.C.

In September, 71 B.C., Crassus entered the city in an ovation, and Pompeius and Metellus in triumph. Both consuls now did their utmost to gain the favour of the people. Pompeius performed his promise to the people of obtaining the restoration of the tribunician power, which Sulla had caused to be abolished. After the expiration of his consulship Pompeius remained at Rome two years without holding any office. His next employment was in the war against the pirates who infested the Mediterranean and even the neighbourhood of Rome. He was invested with very large powers for three years, and he began his operations in the spring of B.C. 67. Within forty days he cleared the sea between Spain, Italy, and Africa, and he concluded the war against the pirates by giving them a decisive defeat at Coracesium in Cilicia. The war did not last above three months, and yet in this short time 120 towns and castles were taken by the Romans, and above 1600 ships were burnt, taken, or surrendered. Pompeius still remained in Asia, his ambition being to have the command in the war against Mithridates, which L. Lucullus now held. A law was passed at Rome, proposed by C. Manilius and supported by Cicero, which conferred on Pompeius unlimited power for conducting the war against Mithridates. In B.C. 66 he set out to supersede Lucullus, who had already broken the power of the king. Pompeius carried on the campaign vigorously, during which he advanced into Armenia against Artáxata, the capital of Tigránes, the ally of Mithridates, where he received the submission of the Armenian king. Mithridates had already fled before him, and escaped to the Tauric Chersonese (Crimea). The campaign of the year B.C. 65 was against the Iberians on the river Phasis, after defeating whom, and neglecting Mithridates, who was no longer formidable, he turned to the south and entered Syria, which he made a Roman province. Jerusalem was besieged and taken, and Judæa recognised the supremacy of Rome by paying an annual tribute. Pompeius had advanced south of Judæa to chastise some of the Arab chiefs, when the news of the death of Mithridates induced him to return to Pontus. He gave to Pharnaces, the son of Mithridates, the kingdom of Bosporus; formed the Roman provinces of Bithynia, and Cilicia and Syria; and disposed of the kingdom of Lesser Armenia to Deiotarus, and of Cappadocia to Ariobarzánes. Tigranes was allowed to keep his kingdom of Great Armenia. In January, B.C. 61, Pompeius landed at Brundusium, and a few months after his arrival before Rome he celebrated his triumph over the pirates and Mithridates, the most magnificent spectacle of the kind that Rome had seen.

Pompeius expected that all his measures in Asia and the distribution of lands which he had promised to his soldiers would be sanctioned by the senate. But he found himself opposed by Cato and the heads of the senatorial party. Upon this he joined the popular party, and thus gained the support of Cæsar. Crassus, the wealthiest of the Romans and the friend of the senate, was also easily gained over, and these three men now formed what is generally called the first triumvirate. During his consulship, Cæsar (59 B.C.), by his Agrarian law, enabled Pompeius to fulfil the promises which he had made to his veterans: large districts of public land in Campania were assigned to them. Cæsar also obtained for him the sanction of the arrangements which he had made in Asia. Pompeius in his turn was obliged to support Cæsar, his apparent friend, in all his designs, and thus he rendered himself more obnoxious to the aristocratic party. Pompeius had divorced Mucia (Cic. 'ad Att.,' i. 12) the mother of his two sons, and Cæsar, to secure him, gave him his young daughter Julia in marriage.

Pompeius allowed his great eulogist Cicero to be driven into exile by the tribune Clodius; and it was not until Clodius had made an attempt to assassinate Pompeius that he promoted the recall of Cicero. Gratitude induced Cicero to endeavour to re-establish Pompeius in the popular favour, by procuring for him the præfectura annonæ for five years, and the proconsular power over all provinces, with fifteen legions at his command. In this capacity he went to Sicily, whence he sent provisions to Rome, and thus gained the favour of the people. At the commencement of the year 56 B.C., Pompeius repaired to Luca, where Cæsar had come from Gaul to spend the winter. Crassus also and many other Romans met Cæsar there. In April, 56 B.C., Pompeius, Cæsar, and Crassus came to an agreement by which Cæsar's generalship of Gaul was to be prolonged for five years, and Pompeius and Crassus were to be made consuls for the following year, with the provinces of Spain and Africa for Pompeius, and Syria for Crassus. Pompeius and Crassus were elected consuls after a fierce opposition. Pompeius built a magnificent theatre, and amused the multitude with gorgeous spectacles. At the end of the year Crassus went to Syria, but Pompeius governed his province by his legates, and remained with his army in the neighbourhood of Rome, where he interfered with the administration of justice, prevented the election of new consuls, and kept up hostilities between the parties at Rome. In September, 54 B.C., his wife Julia died, and when proposals were made for a new alliance with the family of Cæsar, he rejected them. Crassus in the meanwhile perished in the Parthian war. In the quarrels between Milo and Clodius the senate empowered Pompeius to collect troops, and to put an end to the disturbances. At the trial of Milo he surrounded the court with soldiers.

On the 26th of Feb., 53 B.C., Pompeius was made sole consul, but on the 1st of August he made Metellus Scipio, whose daughter Cornelia he had married, his colleague. An old law, that required a candidate for the public office to appear in person at Rome, was directed against Cæsar, who must give up the command of the armies in Gaul if he wished to be elected consul again. Pompeius obtained for himself a prolongation of his proconsulship over Spain for five years. Cæsar, though

absent from Rome, claimed to be elected consul for the following year; and when Pompeius and the senate required him to dismiss his army and present himself at Rome as a candidate, Curio, a tribune whom Cæsar had gained over, insisted that Pompeius should dismiss his army. But a decree was made, declaring Cæsar a public enemy unless he resigned his command and came to Rome as a private man, and Pompeius was empowered to raise troops. The intelligence that Cæsar had crossed the Rúbicon, the boundary of his province, and was marching on Rome, showed the emptiness of the arrogant boasts of Pompeius. He left the city and made his way to Brundusium, leaving general alarm behind him. From Brundusium Pompeius crossed over to Dyrrachium in Epirus, while Cæsar in the meantime was strengthening himself in the west. Cæsar crossed over to Dyrrachium, where Pompeius was strongly posted. Before Dyrrachium Cæsar sustained a check, after which he made his way into Thessaly, followed by Pompeius, who however acted against his own convictions in fighting a decisive battle. On the 9th of August, B.C. 48, was fought the battle of Pharsalia, in which Pompeius was defeated. He fled to Lesbos, whither he had sent his wife Cornelia and his younger son, and from Lesbos he went to Egypt, to seek refuge with the king. He landed there on the 28th of September, but was treacherously murdered in the presence of the king and his army by Septimius, at the instigation of Achillas and Theódotus, who feared the anger of Cæsar. The wife and child of Pompeius, who were still on board the ship, and saw the murder, hastened away. The murderers cut off the head of Pompeius and left the body on the beach, where it was buried by a freedman and a veteran. Cæsar, who arrived in Egypt three days later, shed tears when the head of Pompeius was presented to him, and he put the murderers to death.

British Museum. Aetual Size.

This coin was not struck by Pompeius himself, but by his son Sextus, as appears from the surname *Pius* in *Magnus Pius, Imperator iterum, Præfectus classi et oræ maritimæ ex Senatus consult.* It must have been struck at the time when Sextus had taken possession of Sicily and assumed the title of Imperator for the second time. The single head on one side is supposed to be that of Pompeius the Triumvir, and the two smaller heads to be those of his two sons.

POMPEIUS, CNEIUS MAGNUS, the elder of the two sons of the triumvir Pompeius and of Mucia, was born about 77 B.C. When the war with Cæsar broke out, he was sent to Egypt to collect troops, and he returned to his father's fleet in the Adriatic with 50 ships. After the battle of Pharsalia he remained with the chief part of the naval force at Corcyra; and in the spring of B.C. 47, on his voyage to Africa, he heard of his father's death. He then turned to Spain, where he landed B.C. 46. On the 17th March, B.C. 45, Cneius was defeated by Cæsar at the bloody battle of Munda (Monda in Granada), and, being taken, he was put to death.

POMPEIUS, SEXTUS MAGNUS, the younger son of the triumvir Pompeius, was born in 75 B.C. After witnessing the death of his father in Egypt, he fled to Cyprus with his step-mother Cornelia, and thence to Africa. After the defeat of his party at Thapsus, he went to Spain to join his brother; but the issue of the battle of Munda destroyed his hopes, and he rambled about in Spain for some time. Collecting a number of adventurers and the fragments of his brother's army, he made himself master of Baetica and part of Hispania Tarraconensis. When Octavianus, M. Antonius, and Lepidus, formed a triumvirate, Sextus was declared an outlaw, and he cruised about the Mediterranean as a pirate, and took possession of Sicily. Sextus took no part in the campaign which ended in the battle of Philippi, but he harassed the coasts of Italy, and increased the scarcity of provisions at Rome. Antonius and Octavianus, after quarrelling and being reconciled, agreed to unite their forces against Pompeius, who was cutting off the supplies of Rome. But the starving Romans made such a clamour that Antonius and Octavianus came to terms with him B.C. 39, and Pompeius obtained the proconsulship of Sicily, Sardinia, and other places. This treaty however did not last long. Pompeius and Octavianus quarrelled, and Menodórus, the admiral of Pompeius, deserted to the enemy. The fleet of Octavianus was twice defeated by the fleet of Pompeius, and Menodórus returned to his old master, only to desert him again. It was not until B.C. 36 that M. Vipsanius Agrippa, who commanded for Octavianus, defeated Pompeius in a great sea-fight near Naúlochus. Pompeius fled to Asia, where he was well received by C. Furnius, the legatus of M. Antonius; but he did not long agree with Furnius, and Antonius sent a fleet against him under Titius. Pompeius was caught, and put to death at Miletus, either by the command of Antonius, or by Titius on his own responsibility.

POMPEIUS, TROGUS. [TROGUS POMPEIUS.]

PO'MPILUS, according to Latreille, a genus of Hymenopterous Insects of the section *Fossores* and family *Sphegidæ*. In the systems of Dr. Leach, Mr. Shuckard, and some others, this group of insects is regarded as a family, *Pompilidæ*.

The *Pompilidæ* are extremely active; they run and fly with great rapidity. They are for the most part of moderate size, and are often adorned with red and black colours, at least those species which belong to the genus *Pompilus*. These insects burrow in the ground, preferring sandy situations, and store their cells with spiders, which constitute the food of their larvæ.

The genus *Pompilus* contains numerous species. Mr. Shuckard, in his work on the indigenous Fossorial Hymenoptera, describes 18 species.

Besides Pompilus proper, the genera *Ceropales* and *Aporus* are included in the present family. An account of these genera and of the English

species they contain will be found in Mr. Shuckard's work.

POMPONIUS SEXTUS, a distinguished Roman jurist, who appears to have lived under Antoninus Pius, and to have survived him. An extract from Pomponius, which is in the 'Digest,' contains an historical sketch of the origin and progress of the Roman law, and a list of the law writers to the time of Pomponius.

POMPONIUS MELA. [MELA, POMPONIUS.]

POMPTINE or PONTINE MARSHES is the name of a low marshy plain in the Papal State, about 24 miles long from N.W. to S.E., and varying from 8 to 10 miles in breadth. The plain is bounded on the E. by the *Monti* Lepini; on the W. it is bounded by a range of downs from 30 to 60 feet high, which begin on the S. at Mount Circeo, and thence run to the northwards parallel to and at the distance of from two to three miles from the coast, leaving a belt of land between them and the sea, which is partly covered by forests and partly occupied by *lagoons*. This belt has no water communication with the basin of the Pomptine Marshes. From Mount Circeo eastward to Terracina another ridge of downs of much smaller dimensions runs close to the sea-coast, and is cut through by the canal called Portatore di Badino, which is the great outlet of the waters of the Pomptine Marshes. On the north and north-west the Pomptine Marshes border on the dry plains of Cisterna and Sermoneta. The greatest depression is towards the south-east extremity, where an extent of about three or four square miles is below the level of the sea. The rivers which flow into this basin are the Tepia, Ninfa, Cavata, Ufente, Amazeno, and Pedicata.

There is every appearance that the basin of the Pomptine Marshes was once a gulf of the sea, which has been gradually filled up by alluvium from the mountains. Within the historical period it was a fertile district, containing towns, and a considerable population. Both under the Republic and the Empire great works were undertaken for the draining of these marshes; and the Appian Road traversed part of them to Terracina. Something has been done in modern times by the popes, from Boniface VIII. to Pius VI., and by the French during their occupation of the Roman States. Since that time all that has been done for the Pomptine Marshes has been to maintain the drainage in the state in which Pius VI. left it, by keeping the canals clear and the dykes in repair. The greater part of the plain is covered with rich pastures, in which are fed numerous herds of horned cattle, and other parts of it are sown with rice, wheat, and Indian corn, and afford rich crops. In the spring, before the great heat renders the atmosphere unwholesome, it has the appearance of a most delightful region. But, except the post stations along the high road, and some scattered huts here and there, there is no permanent population throughout the whole of the plain.

PONANY. [HINDUSTAN, vii. 193.]

PONCE DE LEON, JUAN, a native of Leon, accompanied Columbus in his second voyage in 1493, and was appointed lieutenant to the governor of Hispaniola. In 1508, having received intelligence from the natives that the neighbouring island of Boriquen, or Puerta Rico, abounded with gold, he succeeded in effecting its subjugation, after many hard-fought battles; but he was superseded in the command of the conquered country. He next appears to have conceived the idea that there was yet a third world to be discovered, and hoped to be the first to reach it; but, as he was then fast advancing in life, he decided to sail first to a certain island of the Bahama group, called Bimini, where, according to a tradition, there was a fountain possessing the power of restoring youth. He did not however discover either the island or the fountain; but sailing, in the course of his search, to the south-west, he came in sight of what he supposed to be an island, March 27, 1512, which he called 'Pascua Florida.' Ponce took possession of the country in the name of Ferdinand and Isabella. In a subsequent expedition he came upon the western coast of Florida, where he made a descent; but the Indians sallying forth to defend their shore, several of his men were slain, and himself wounded by an arrow in the the thigh, of which he died soon after, at Cuba, in 1521.

PONCE, PEDRO, a Spanish Benedictine monk, in the convent of Oña, in Old Castile, was born about the year 1530. He is considered the inventor of the art of teaching the dumb to speak, which he carried to such perfection as to make us doubt whether Braidwood, L'Epée, Sicard, and others accomplished more than he did. [BONET, vol. iii., 596.] Ponce died in 1584, and was buried in the convent of his order.

POND, JOHN, was born about 1767, and was educated at Trinity College, Cambridge. Having been obliged, from the ill health which attended him almost through life, to spend several years abroad, he settled himself, on his return, at Westbury, near Bristol, where he resided till his marriage in 1807. He then settled in London; and in 1811 was appointed to succeed Dr. Maskelyne as astronomer royal. He retired from this office upon a pension in 1835, and died September 7, 1836, at Blackheath.

Mr. Pond's attention was directed to astronomy by Wales, to whom it is stated that, when a boy, he pointed out some apparent imperfection of the Greenwich instruments, as shown in their published results. He did not continue this study at Cambridge, and missed the opportunity of acquiring that depth of mathematical knowledge which is necessary for the comprehension of the highest branches of the theory of gravitation. The branch of astronomy to which he devoted his subsequent life was the determination of the places of the fixed stars; and in knowledge of the instruments and methods necessary to be used, and sagacity in detecting and avoiding error, the opinion of those who are best able to judge places him second to none of his day.

PONDICHERRY, a considerable town on the sea-coast of the Carnatic, in Hindustan, formerly the principal seat of the French power in the East Indies, in 11° 57′ N. lat., 79° 54′ E. long., 85 miles S. by W. from Madras.

Pondicherry was purchased by the French from the Raja of Bejapoor in 1672, and was first occupied by them in 1674, after the failure of the first expedition of the India Company, projected by Colbert, for the purpose of establishing the French power in Hindustan. It was several times taken by the English during the long contention between the two nations for supremacy in Hindustan, in the course of which the town was once (in 1761) entirely demolished. The rebuilding commenced in 1765. It was finally restored to the French at the peace of 1814.

Pondicherry is built in a sandy plain not far from the shore, and consists of two parts, the White Town and the Black Town, the former containing the Europeans, the latter the natives. The White Town is handsome; the streets are built with remarkable regularity, intersecting each other at right angles, and are of a uniform width. The houses are tolerably high, and have flat roofs; they are covered with stucco, white or yellow, and are adorned with fore-courts or gardens. In the centre of the city is a spacious square planted with trees and laid out in walks, and open on the east side to the sea. The Black Town lies to the south of the White Town, from which it is separated by a ditch or canal, with trees planted along the bank: it is laid out almost as regularly as the White Town, but the houses are for the most part mere huts. Of the fortifications nothing remains but a brick tower, where the flag is hoisted. The French are debarred by treaty from restoring the fortifications, or from maintaining any force beyond what is necessary for the purposes of police. The town contains a government-house, a bazaar, and several churches. There is a grand pagoda in the Black Town, a building of great size and grotesque architecture.

The population of the town and suburbs is computed to be 40,000. Trade is dull. The fiscal regulations of the British prevent the carrying on of any traffic with the interior. There is no harbour, but a tolerable roadstead. Indigo, sugar-cane, millet, dye and aromatic woods, and mulberry-trees, are cultivated in the neighbourhood. The exports consist of rice, drugs, sugar, indigo, and blue linens. The imports are lace, and articles of dress, furniture, jewellery, and books. There are courts of justice, a mint, a college, schools for whites and for blacks, a botanic garden, a mont-de-piété, or office for small loans, and several charitable institutions.

PONIATOWSKI, STANISLAUS, COUNT, a Polish nobleman, born in 1678, who took the part of Stanislaus Leckzinski and of his protector Charles XII. of Sweden, against King Augustus and the Russian party in Poland. [AUGUSTUS II. of Poland; CHARLES XII. of Sweden.] He served under Charles at the battle of Poltawa, assisted his escape, and after his arrival at Bender, Poniatowski repaired to Constantinople, where, without connections, and the representative of a fugitive king, he contrived to engage the Porte to espouse the cause of Charles, and to attack Russia.

On the death of Charles, all hopes of seeing Stanislaus restored to the crown of Poland having vanished, Poniatowski made his submission to King Augustus, who made him treasurer of Lithuania, general of the guards, and lastly, palatine of Masovia. Augustus III. made him, in 1752, castellan of Cracow. He died in 1762.

PONIATOWSKI, JOSEPH, PRINCE, born at Warsaw, in 1763, was the grandson of the preceding and nephew to Stanislaus Augustus, the last king of Poland. He entered the Austrian service, and became colonel of dragoons and aide-de-camp of the Emperor Joseph II., with whom he made a campaign against the Turks in 1787. In 1794, when the Poles rose against the Russians, Joseph Poniatowski served under Kosciusko, but Kosciusko being defeated, he was obliged to emigrate, and he retired to Vienna. In 1798 he returned to Warsaw, and afterwards took the command of the Polish army, which rendered such great services to the French during the campaign of 1807 against the Russians. When the war broke out between France and Russia in 1812, Poniatowski obtained the command of the fifth corps of the 'grand army,' which was composed entirely of Poles. He maintained the strictest discipline in his corps, which in the disastrous retreat from Moscow distinguished itself by its orderly behaviour. Being obliged to evacuate Warsaw, Poniatowski withdrew into Saxony, but in the following campaign of 1813 he fought with his usual bravery in various battles, and was made a marshal of France by Napoleon just before the battle of Leipzig. A few days after, Oct. 18, being pressed by the enemy upon the banks of the Elster, which was swelled by the rains, he spurred his horse into the river, and was drowned.

PONS. [CHARENTE-INFE'RIEURE.]

PONS, ST. [HE'RAULT.]

PONT-AUDEMER. [EURE.]

PONT-A-MOUSSON. [MEURTHE.]

PONT-CHATEAU. [LOIRE-INFE'RIEURE.]

PONT-CROIX. [FINISTE'RE.]

PONT-DE-L'ARCHE. [EURE.]

PONT-DE-BEAUVOISIN. [ISE'RE.]

PONT-DU-GARD. [GARD.]

PONT-L'ABBÉ. [FINISTE'RE.]

PONT-L'EVE'QUE. [CALVADOS.]

PONT-ST.-ESPRIT. [GARD.]

PONT-STE.-MARIE. [LOT-ET-GARONNE.]

PONTARLIER. [DOUBS.]

PONTE-CORVO. [LAVORO, TERRA DI.]

PONTEDERA'CEÆ, a natural order of plants belonging to the class of Endogens. The species are aquatic or marsh plants. They are natives exclusively of North and South America, the East Indies, and tropical Africa. Very little is known of their uses. Some of the species are employed by the native Indian practitioners in liver complaints and diseases of the stomach.

PONTEFRACT. [YORKSHIRE.]

PO'NTIFEX was the name by which the Romans designated the members of the most illustrious of their great colleges of priests. The Pontifices are said to have been instituted by Numa Pompilius for the purpose of taking care that the laws relating to religion should be observed. Their original number, according to Livy (x. 6), was four,

two for each of the tribes of the Ramnes and Tities. Cicero ('De Rep.,' ii. 14) says that their number was five, but he includes the Pontifex Maximus, or chief pontiff.

The minor pontiffs were a college of priests of which scarcely anything is known.

When the great state-offices had become accessible to the plebeians, they also obtained the privilege of being represented in the college of pontiffs by members of their own order. This change was brought about in 300 B.C. by the Ogulnian law, by which the original number of pontiffs, through the addition of four plebeians, was increased to eight, or, including the chief pontiff, to nine. (Liv., x. 6, 9.) The chief pontiff however continued to be taken from the patricians to the year 254 B.C. The further history of the college belongs to the political history of Rome.

The College of Pontifices had a general superintendence over religion, and such matters as were specially connected with religious celebrations. The office of the Pontifex Maximus, and that of the other Pontifices also, were for life. The rules of law which were applicable to such things as belonged to the jurisdiction of the Pontifices, were comprehended under the term 'Jus Pontificium.' Augustus was made Pontifex Maximus, and his successors held the same office to the time of Gratianus, who it is said refused it. The letters P. M. on the coins of the Roman emperors denote Pontifex Maximus.

PONTIUS, PAUL, an engraver, was born at Antwerp in 1596, according to some accounts, according to others in 1603. Pontius was the pupil of Vorsterman, and is chiefly distinguished for his prints after Rubens, which he executed under that painter's inspection. He engraved also a set of portraits after Vandyck, including those of many of the Flemish painters.

PONTIUS PILATE. [PILATE, PONTIUS.]

PONTIVY. [MORBIHAN.]

PONTOISE. [SEINE-ET-OISE.]

PONTOON, or PONTON. This term is employed by the French to signify any barge or flat-bottomed boat; but in this country it is confined to those vessels which are used in the formation of floating-bridges for military purposes.

Bridges consisting of timber platforms supported on floating vessels appear to have been in use in all ages. But those which were thrown by Darius across the Bosporus, and subsequently over the Danube, and that which was formed by the order of Xerxes over the Hellespont at the time of his unsuccessful expedition into Europe, are the most famous works of that nature which were constructed by the ancients: and Herodotus has given (lib. vii. 36) a full description of the last.

The precise period at which pontoons, or flat-bottomed vessels, were first employed to support a bridge is unknown. But mention is frequently made of pontoon-bridges, both in Germany and Italy, in the beginning of the eighteenth century, particularly during the campaigns of Marlborough; and, from the speed with which they are said to have been executed when required, it is probable that a corps of men was then particularly employed in that branch of service. Pontoons, or flat-bottomed boats of wood, apparently similar to those of the preceding century, were employed on the continent during the wars which arose from the first French Revolution.

Major-General Pasley, to whom the department of military engineering in the British service is so much indebted for the improvements which he has introduced into every branch of art connected with practical fortification and siege operations, constructed pontoons in the form of canoes, with decks, each end being shaped like the head of a boat. They consist of light timber frames, covered, except the deck, with sheet copper; and each vessel is formed in two equal parts by transverse partitions, so that the demi-pontoons may be separated from each other when the bridge is to be conveyed on carriages by land with the army. When in the water, the parts are connected together by a rope, which passes through two perforations in the keel, near the place of junction, and by a rectangular frame of wood, which is laid along the deck, and attached to it by lashings.

Sir James Colleton, some years since, invented pontoons of wood of a cylindrical form, some of which have been occasionally employed in experimental operations; and cylindrical pontoons of tin, which were subsequently invented by Major (now Colonel) Blanchard, have lately been introduced into the service. These last have hemispherical or conical ends. "They possess the advantages of great lightness and buoyancy; but they have not the durability of copper vessels, and they must be very liable to be injured when transported by land, particularly if a march should take place under a hot sun.

In 1836 the comparative merits of Colonel Pasley's and Colonel Blanchard's pontoons were tried upon the Medway, and a superiority of steadiness on this occasion appears to have led to a preference in favour of the pontoons proposed by the last-mentioned officer. These are now used in the service.

The diameter of one of Col. Blanchard's cylinders is 2 ft. 6 in., and its length 22 ft. A rectangular frame, rather greater in length than the breadth of the intended bridge, is made fast, by ropes, longitudinally, on the surface of each of two cylinders placed parallel to one another at about 10 ft. asunder; and on these frames rest the baulks carrying the chesses, or planks, which form the road. Two pontoons, with their platform, constitute a raft; which, when the bridge is to be formed, are rowed to their stations in a line across the river, the lengths of the pontoons being parallel to the banks, and there anchored; the distances between the nearest pontoons in two rafts being equal to that between the two pontoons in each raft. Then each raft carrying the materials which are to make a platform over the water between itself and the next, such platform is laid down in a manner similar to that which is employed in laying down the platform of the raft; and from each of the extreme pontoons a like platform is extended to the shore of the river.

PONTOPPIDAN, ERIC, born at Aarhuus, in

Jutland, was the son of Louis Pontoppidan, a clergyman. Eric studied at Copenhagen, where he obtained a chair of theology in 1738. In 1747 he was made bishop of Bergen in Norway. He was the author of numerous works, both in Danish and Latin, upon historical, religious, and antiquarian subjects.

Pontoppidan died at Bergen in 1764. His essay on the 'Natural History of Norway,' which was translated into English in 1755, contains some wonderful stories about sea-serpents, the kraaken, and other monsters.

PONTORMO, JA'COPO DA, or Jacopo Carrucci, was born at Pontormo in 1493, and died at Florence in 1558. He studied under Leonardo da Vinci, Albertinelli, Piero di Cosimo, and Andrea del Sarto. He painted for some time in a similar style to Andrea, and was that painter's rival. Towards the close of his life he spent eleven years in painting some frescoes of the Deluge and the Last Judgment in the church of San Lorenzo, in Florence, in the manner of Michael Angelo, but they have long since been whitewashed over.

PONTS-DE-CÉ. [MAINE-ET-LOIRE.]

PONTUS, a country of Asia Minor, derived its name from the expression 'on the Pontus Euxinus' (ἐν Πόντῳ), and was used rather as a political than a geographical term. Under Mithridátes the Great it included the whole of Paphlagonia and part of Bithynia; but the name is usually applied to the country between Colchis and the River Halys, and is consequently bounded on the W. by Paphlagonia, on the S. by Cappadocia, and on the E. by Colchis. On the S. Pontus is separated from Cappadocia by a lofty range of mountains called Paryadres. The north-eastern part of Pontus is exceedingly barren, and was inhabited by various barbarous tribes, of whom Xenophon has given some account in the 'Anabasis.' The western part of the country, which is very fertile, is well drained by the Iris (Yeshilermak) and the Thermódon (Thermeh), and supplies good pasture for numerous flocks.

Pontus was erected into a separate kingdom by Ariobarzanes I. about the beginning of the fourth century B.C. The history of the kings of Pontus is given in an appendix to the third volume of Clinton's 'Fasti Hellenici.' After the death of Mithridates VI. the greater part of Pontus was annexed to the Roman province of Bithynia.

The chief towns on the coast of Pontus, proceeding from east to west, were Trapezus (Trebizond), a colony of the Greek colony Sinópe; Cérasus (Kheresoun), afterwards called Pharnacia, from Pharnaces, who was one of the kings of Pontus. Pharnacia is said to be the place from which L. Lucullus brought the cherry to Europe; Cotyóra, also a colony of Sinópe; Themiscyra; and Amisus (Samsoun), a Greek colony and a flourishing city when it was besieged by L. Lucullus. In the interior the chief towns were Amasia (Amasieh), the birth-place of Strabo; and Comána, called Pontica, to distinguish it from a town of the same name in Cappadocia. Comana had a great temple dedicated to Ma, to which were attached several thousand slaves, most of whom were females: the office of high priest of this temple was a place of honour and emolument. (Strabo, p. 557-559, ed. Casaub.)

PONTYPOOL. [MONMOUTHSHIRE.]

PONZ, ANTONIO, born in 1725, at Bexix, in the district of Segorbe, in Valencia, relinquished at an early age his intended profession—the church—and went to Madrid, where he enrolled himself among the first pupils of the Academy of the Fine Arts. In 1751 he went to Italy, and studied for more than nine years at Rome. On his return to Madrid, he was commissioned by the king (Charles III.) to adorn the library of the Escurial with a series of portraits of eminent literary characters. This task occupied him between five and six years, and immediately after its completion he was appointed to visit the colleges, &c., of the Jesuits, then recently suppressed in Spain, for the purpose of taking an account of the paintings, &c., contained in them. It is to this circumstance that we are indebted for his 'Viage de España,' in 18 vols.; the preparation of this work, including the tours he made, occupied him from about 1771 to 1790, when his declining health prevented him from completing his plan. He died at Madrid, Dec. 4, 1792.

Ponz was secretary to the Academy of the Fine Arts, and a member of several other learned bodies. Besides his principal work he published another in two volumes, entitled 'Viage fuera de España,' in which we meet with observations on some of the buildings in London.

PONZA, a rocky island off the coast of Naples, 35 miles S.W. of Gaëta, is about 5 miles long, 1½ mile wide, and in shape like a crescent, the concave side facing the mainland of Italy. On the same side is the harbour, which is a natural basin with a narrow entrance, surrounded by high ground, and perfectly safe in all weathers. The island is mostly barren, but affords some pasture for cattle. Round the harbour are ranged some buildings, among which is a castle used as a state prison by the government of Naples. The Roman name of the island was *Pontia*.

POOLE. [DORSETSHIRE.]

POOLE, MATTHEW, was born at York about 1624, and inherited a good estate in that county. He was educated at Emmanuel College, Cambridge. We find him, in 1662, in possession of the church of St. Michael le Querne in London, which he resigned, being unable to comply with the terms imposed by the Act of Uniformity. He had, in 1658, published a book entitled 'A Model for the maintaining of Students of Choice Abilities in the University, and principally in order to the Ministry.'

Being ejected from his cure he had leisure to devote himself to the completion of the great work, the 'Synopsis Criticorum Biblicorum,' which has made his name so extensively known. This, after ten years' labour, he completed, and the first two volumes appeared in 1669. He was also the author of 'The Nullity of the Romish Faith,' 1666, and of other treatises in the controversy with the papists. He retired to Holland to find the toleration which was denied him at home, and died at Amsterdam in 1679.

POONAH, a city of Hindustan, in the presidency of Bombay, in 18° 30′ N. lat., and 73° 52′ E. long., is situated at the confluence of the rivers Moula and Mouta. It is about 80 miles S.E. from Bombay, direct distance. Poonah stands on an extensive plain, or rather table land, which is about 2000 feet above the level of the sea, and is bordered by hills which rise 1500 or 2000 feet above the plain itself. These hills are steep and rugged. There are a few gardens in the suburbs of the city, but as both the gardens and the city lie in a hollow, the general appearance of the surrounding plain is naked and desolate.

Poonah was formerly the seat of the Mahratta sovereignty, and the residence of the Peishwa. It is not a handsome city, nor apparently of large size, though its extent must be considerable, since its population in 1819 was estimated by Mr. Elphinstone at 115,000, and Bishop Heber in 1825 was informed that it then amounted to 100,000. The city is not walled, the houses are very irregularly built, and the streets are ill paved and interspersed with peepul-trees. The bazaars are mean: there are many pagodas, but none of them either large or handsome. The palace of the Peishwa was large, and had a handsome quadrangle surrounded by cloisters of carved wooden pillars, but the external appearance was not striking. The British have a military cantonment a little to the west of Poonah, which is laid out in wide streets and well arranged. It is much resorted to by visitors from Bombay.

The cave-temple of Carlee is about a mile from Carlee, which is the last village on the great road across the Western Ghauts from Bombay to Poonah. The temple is hewn in the face of a rocky precipice, two-thirds up the side of a steep hill which is about 800 feet above the plain, and is approached by a narrow path winding up the side of the hill among trees and brushwood and fragments of rock. Besides the principal temple, there are many smaller apartments and galleries, in two stories, some of them beautifully ornamented. The approach to the temple is under a noble arch filled up with a sort of portico-screen, in two stories of three intercolumniations below and five above. Within the portico, to the right and left, are three colossal sculptures of elephants, in alto-rilievo, with their heads, tusks, and trunks projecting boldly from the wall. On each of them is a driver, very well carved, and a palanquin, with two persons seated in it. The internal screen of the vestibule leading to the temple is covered with alti-rilievi of male and female figures, somewhat larger than life. The temple itself is about 60 feet long by 30 wide, surrounded on every side but that of the entrance with a colonnade of octagonal columns, the capitals of which consist of a large cap like a bell, finely carved, and surmounted by two elephants with their trunks entwined, and each carrying two male figures and one female. The roof is decorated with ribs of timber, which are not for support, but have a fine effect in the perspective of the interior. There is no image of Budda or any other idol in this temple.

POOR LAWS and PAUPERISM. A pauper in England is a person who, being unable to support himself, receives money or money's worth from the contributions of those who are by law compelled to maintain him wholly or in part. He who gets his living by his labour, but receives no legal relief, is not a pauper. He who will not or does not work, but gets his living by begging, is a mendicant. Those who are supported wholly or in part by the voluntary gifts of charitable persons are not paupers.

The great object of the earlier efforts in pauper legislation was the restraint of vagrancy, as appears from the 12 Richard II. c. 7 (1388), the 11 and 19 of Henry VII. (1495 and 1504), and the 22 Henry VIII. c. 12 (1531), which, however, appear to have had no permanent effect in repressing vagrancy. An act passed in 1536 (27 Henry VIII. c. 25), about the time of the dissolution of the monasteries, is the first by which an authorised machinery was established for the collection and distribution of funds contributed for the relief of the poor. It enacts that the head officers of every parish to which the impotent or able-bodied poor may resort under the provisions of the act of 1531, shall receive and keep them, so that none shall be compelled to beg openly. The able-bodied were to be kept to constant labour, and every parish making default was to forfeit 20s. a month. The money required for the purposes of this act was to be derived from voluntary contributions collected partly by the head officers of corporate towns and the churchwardens of parishes, and partly in the churches, and on various occasions where the clergy had opportunities for exhorting the people to charity. This voluntary system does not appear to have been very effectual; and after some intermediate legislative experiments, the principle of compulsory taxation for the purpose was introduced (though to a very limited extent) by the 5 Eliz. c. 3, passed in 1563. This principle was brought into full operation a few years afterwards (1572) by the 14 Eliz. c. 5; and formed the basis of the subsequent statute 43 Eliz. c. 2, which has been in operation from the time of its enactment, in 1601, to the present day. A change in the mode of administration was however effected by the Poor Law Amendment Act (4 & 5 Wm. IV. c. 76), which was passed in 1834. During that long interval many abuses crept into the administration of the laws relating to the poor. In its original provisions the act of Elizabeth directed the overseers of the poor in every parish to 'take order for setting to work the children of all such parents as shall not be thought able to maintain their children,' as well as all such persons as, having no means to maintain them, use no ordinary trade to get their living by. For this purpose they were empowered 'to raise, weekly or otherwise, by taxation of every inhabitant, parson, vicar, and other, and of every occupier of lands, houses, tithes, mines, &c., such sums of money as they shall require for providing a sufficient stock of flax, hemp, wool, and other ware or stuff, to set the poor on work, and also competent sums for relief of lame, blind, old, and impotent persons, and for putting out children as apprentices.' The

churchwardens and overseers were further empowered to build poorhouses, at the charge of the parish, for the reception of the impotent poor only. The justices were further empowered to assess all persons of sufficient ability, for the relief and maintenance of their children, grand-children, and parents. The parish officers were also empowered to bind as apprentices any children who should be chargeable to the parish.

In 1832 a commission was appointed by the crown, under whose direction inquiries were made through England and Wales, and the condition of the labouring class in every parish was ascertained with the view of showing the evils of the existing administration of the law, and of suggesting some remedy. A Report was presented by the commissioners, which explained the operation of the law as administered, with its effects upon different classes, and suggested remedial measures. This Report was presented in February, 1834, and was followed by the passing in August, 1834, of the Poor Law Amendment Act, 4 & 5 Wm. IV. c. 76, in which the principal recommendations of the commissioners were embodied. This act has been subsequently amended by various acts, in reference to details of administration.

The chief provisions of this law are the following:—A central board is appointed for the general superintendence and control of all bodies charged with the management of funds for the relief of the poor. This central board now consists of a president (who is in parliament) and four of the great officers of state; with two secretaries, of whom one is in parliament. There are 13 assistant-commissioners, each one of whom has a district. The assistant-commissioners visit their districts and see that the orders of the board are executed. The assistant poor-law commissioners are appointed by and removable by the board. The administration of relief to the poor is under the control of the commissioners, who make rules and regulations for the purpose, which are binding upon all the local bodies. They are empowered to order workhouses to be built, hired, altered, or enlarged, with the consent of the majority of a board of guardians. They have the power of uniting several parishes for the purposes of a more effective and economical administration of poor relief, but so that the actual charge in respect to its own poor is defrayed by each parish. These united parishes, or Unions, are managed by boards of guardians annually elected by the rate-payers of the various parishes, but the masters of workhouses and other paid officers are under the orders of the commissioners, and removable by them. The system of paying wages partly out of poor-rates is discontinued, and except in extraordinary cases, as to which the commissioners are the judges, relief is only to be given to able-bodied persons or to their families within the walls of the workhouse. Another branch of the poor-law, which was materially altered by the act of 1834, was that relating to illegitimate children, but the provisions of that act upon this subject have been greatly modified by the amending statute of 1844, the 7 & 8 Vict. c. 101. [Bastard.]

One important consequence which has resulted from the better management of the poor, is the adoption of plans for the education of children resident in workhouses. Under the administration of the unamended law little or nothing was done towards this object, and in almost every case the child whose misfortune it was to be brought up at the charge of the parish continued through life dependent upon others for subsistence, and often followed a course of systematic dishonesty. The system of moral, intellectual, and industrial training which has been to some extent engrafted upon the administration of the amended law, is calculated to bring up the children of the workhouse to be useful members of society.

The overseers collect the poor-rate from the persons rated. If a person rated does not pay when called upon, the overseers may obtain a summons from two justices, requiring him to show cause why a warrant should not issue to levy the rate by distress and sale of his goods; and if no sufficient cause is shown, the payment is enforced accordingly. The party so summoned may show for cause that the rate itself is void, or that he is not liable; he may also, with the consent of the overseers, or board of guardians, be excused, if it appear that he is unable to pay through poverty. He may also appeal against the rate, and notice of appeal deprives the magistrates of their jurisdiction to distrain until the appeal is decided, unless the objection is solely on the ground of overcharge, in which case the warrant may issue for such a sum as the property was rated at in the last valid rate. The appeal against the rate on the ground of inequality, unfairness, or incorrectness in the valuation of the property rated, may be to justices at petty-sessions, from whose decision a second appeal lies to the general quarter-sessions. The appeal, on the above grounds, may also be taken to the quarter-sessions in the first instance. If the objection be to the principle of the rate itself, or it is intended to dispute the liability of the property to be rated, the appeal lies to the quarter-sessions only.

The overseers, who in some parishes are aided by assistant overseers, are to apply the poor-rate to the relief of the poor of their parish, and to supply the funds required by the boards of guardians for the like purpose. The poor of the parish are, in one sense, all those who happen to be in the parish at the time of their being in a state to need relief. But if the same parish were bound also to afford continued relief to, or permanently to maintain, all the destitute who should come within it, the burden of supporting the poor might press very unequally upon different parishes. The 13 & 14 Car. II. c. 12, was passed to obviate these evils, and is the foundation of the present law which determines the parish that a pauper belongs to, and gives the power of removing him to it; but restrictions have been recently placed upon this power, for the benefit of the pauper, by the 9 & 10 Vict. c. 36. This law is called the Law of Settlement.

All persons, whether natural born subjects of England and Wales, Scotchmen, Irishmen, or foreigners, may gain a settlement in this country. Paupers who have no settlement must be main-

tained by the parish in which they happen to be, as casual poor, unless they were born in Scotland or Ireland, or in the islands of Man, Jersey, or Guernsey, in which case they are to be taken under a pass-warrant of two justices to their own country. When a pauper has become chargeable, and it is sought to remove him, he is taken before two justices, who inquire as to his place of settlement, and, if satisfied, upon his examination and such other evidence as may be laid before them, make an order for his removal thither. The parish to which he is removed may dispute its liability by appeal to the quarter-sessions, when the order of removal will be quashed, if it appear that the pauper is not settled in the appellant parish.

The Poor-Law Amendment Act (4 & 5 Wm. IV. c. 76) made no change in the law respecting the rateability of property or the mode of collecting the rate. The act does not apply itself to the rate until collected; it then takes up the rate for the purpose of securing a better distribution of it. The administration of relief to the poor throughout England and Wales is subject (as already mentioned) to the control of the poor-law board. In parishes or unions where there are guardians or a select vestry, relief is to be given solely by such guardians or vestry, or by their order, unless in cases of urgent distress. In these cases an overseer is bound to give temporary relief in articles of absolute necessity, but not in money. In parishes which have no guardians or select vestry, the management and relief of the poor is still left to overseers, subject to the control of the commissioners. Overseers are still intrusted with the making and collection of the poor-rate, which they are to pay over to those who have the distribution of it. The general discretionary power which magistrates formerly exercised in ordering relief is also withdrawn. But a single magistrate may still order medical relief, when called for by sudden and dangerous illness; and two magistrates may order relief to adult persons who from age or infirmity are unable to work, without requiring them to reside in the workhouse. In substance, the wants of the poor are more effectually supplied than before the act, but the manner of administering relief is so regulated, by subjecting the applicants for it to the discipline of a workhouse and to other restraints, that the condition of a pauper, living upon the parish fund, is depressed, in point of comfort, below that of a labourer. Thus a ready test is applied to distinguish real and pretended destitution, and a powerful incentive to work is held out to all who can find employment.

The means also of obtaining employment are increased by enlarging the market for the poor man's labour. This is the result of a relaxation in the law of settlement, and particularly of settlement by hiring and service. The old law had been found to obstruct the free circulation of labour by confining the poor to their own parishes; and notwithstanding the ameliorations effected by the act of 1834, and subsequent statutes, the law of settlement and removal still requires revision and reform.

Settlement by parentage and settlement by birth are both affected to this extent, that illegitimate children born after the passing of the act are to follow the settlement of their mother until the age of sixteen or until they acquire a settlement in their own right, instead of taking, as formerly, the settlement of the place of their birth.

Any person who marries a woman having children, whether legitimate or illegitimate, is liable to maintain them until they attain the age of sixteen, or until the death of the mother.

(Blackstone's *Comm.*, 359; Nolan's *Poor Laws;* Burn's *Justice*, 'Poor;' Gambier *On the Law of Settlement.*)

The following Abstract of a Return to an order of the House of Commons, dated Feb. 19, 1849, gives the statistical information as to the extent of pauperism in Great Britain and Ireland:—

The annual value of the property rated to the poor-rate in *England*, for the year ending March 25, 1848, was 67,320,587*l.*; the expenditure for the relief and maintenance of the poor was 6,180,765*l.*, being an average rate of 1*s.* 10*d.* in the pound. The total number of paupers relieved, including casual poor, was 1,876,541, at an average per head of 3*l.* 5*s.* 10½*d.* In *Ireland*, for the same period, the annual value of property rated was 13,187,421*l.*; the expenditure on the poor was 1,216,679*l.*, being an average rate of 1*s.* 10½*d.* in the pound. The total number of paupers relieved was 1,457,194, at an average per head of 16*s.* 8¾*d.* In *Scotland*, for the year ending May 14, 1848, the annual value of property rated was 9,320,784*l.*; the expenditure on the poor was 544,334*l.* (exclusive of cottages and gardens granted in Highland parishes, rent-free, to paupers), being an average rate of 1*s.* 0½*d.* in the pound. The total number of paupers relieved was 227,647, at an average per head of 2*l.* 7*s.* 9½*d.*

POOR LAWS, IRELAND. Until the passing of the Act 1 & 2 Vict. c. 56, which received the royal assent on the 31st of July, 1838, no provision had been made by law for the relief of the helpless or the destitute in Ireland, except by means of county infirmaries and other medical charities established by law. Under that act, the relief which might be allowed to the destitute poor could only be afforded in workhouses; but on the 8th of June, 1847, an act (10 & 11 Vict. c. 31) was passed to make further provision in this matter, by permitting the allowance of out-door relief under certain circumstances. These statutes also enable the guardians to assist poor persons to emigrate. At first, the superintendence of the Irish Poor Law was entrusted to the Poor Law Commissioners for England and Wales, but was subsequently transferred to a separate commission appointed exclusively for Ireland.

POOR LAWS, SCOTLAND. The foundation of the old Poor Law of Scotland was the act of parliament 1579, c. 74, which in many respects resembled the celebrated English statute of the 14th of Elizabeth, passed a few years earlier. It did not provide however for the relief of the able-bodied who were destitute; and a settlement

under it which was acquired by birth could not be changed but by a seven years' industrial residence elsewhere. This period of industrial residence was in 1672 shortened to three years, and till within a very recent period, owing in part to the small number of the poor, and the necessary relief involving only a very trifling assessment, and partly to the fact of the charity of the church-going public being devoted to that relief, niggardly as it was, the Scottish system was very favourably received, not only by the great body of the landowners and clergy in Scotland, but by political economists, who saw the country in an apparently sound moral condition, with a parsimonious poor-law, while the lavish system of England seemed to promote profligacy and idleness. But during the time that had elapsed up to the completion of the great change of the English poor law, a vast internal alteration had taken place in the social economy of Scotland. The comparatively low rate of wages, attracting manufacturing capital from England, had caused a more than average migration of rural labourers to the manufacturing districts, and a peculiarly rapid increase of the town population. It was then found that the simple parochial system, adapted to a very different state of society, was altogether incapable of grappling with the complicated rights and obligations of the different parishes, and that even for poor country districts the system was unsuitable, since the town administrators of relief, though still far behind the English in profusion, were compelled by the voice of public opinion to become more liberal in their dispensations, while the managers of the country parishes not subject to the same influence, kept down the allowances, and thus gave the poor every inducement to seek, and if possible obtain, a legal settlement by three years' industrial residence in the towns.

It was soon discovered that the utter inadequacy of the provision afforded to those who, by inability to work, or bad seasons, or revulsions in trade, were reduced to want, was an extensive cause of disease, vice, and misery. The amount expended on the relief of the poor in Scotland amounted to little more than a sixth part of the sum distributed throughout an equal population in England, even by the then economised poor law. In England the expense amounted to 6*s.* 10¾*d.* per head; in Scotland to 1*s.* 2½*d.* In some instances sums averaging from 3*s.* to 1*s.* monthly were solemnly awarded to destitute people, as the provision which the poor law made for their wants. The discussion of these matters however had a tendency gradually to increase the amount of the provision for the poor, and a return to parliament in 1843 shows that between 1836 and 1841 the sums raised by assessment had considerably increased.

In 1845 an act was passed, which made considerable alterations in the Scotch system. By this act (8 & 9 Vict. c. 83) a board of supervision is appointed, consisting of persons connected with the municipal bodies and the administration of justice in Scotland, with one salaried member, who gives constant personal attendance. The office of the board is in Edinburgh. This board is endowed with ample means for ascertaining, in all parts of the country, the condition of the poor, and the method in which the system of relief is administered. The board has however no directory or prohibitory control over the proceedings of the local boards, though these bodies are reorganised by the act. In the rural parishes where there is an assessment, the local board is to consist of proprietors of property of 20*l.* annual value, the kirk session, and certain elected representatives of the other rate-payers, according to the number fixed by the board of supervision. In city parishes, the boards are each to consist of four persons named by the magistrates, deputies not exceeding four from each kirk session in the city, and certain elected persons, according to a number and qualification fixed by the board of supervision. In parishes where there is no assessment, the management is to continue under the old system. There is thus in this act no machinery for levying or exacting a rate for the poor, unless in those parishes where the persons more immediately concerned agree to such a measure. It is held however that the facilities which the statute gives the poor for exacting from the respective parochial authorities the relief to which they are entitled, will render it necessary to put more extensive funds at the disposal of the distributors of relief, and this can only be accomplished through the system of assessment. When persons apply for relief, it is provided that though they have no settlement, if the claim would be just in the case of their having one in the parish where it is made, subsistence must be afforded them till it is determined what parish is liable. When relief is refused, the applicant may apply to the sheriff, who may grant an order for temporary relief, and then hear parties, and decide whether the applicant is or is not entitled to relief. In this form however neither the sheriff nor any other judge can decide on the adequacy of relief. The initial step to any judicial appeal against the amount of the relief afforded is by an application to the board of supervision, and on that body reporting its concurrence, the applicant is placed on the poor-roll of the court of session, where he has the privilege of the question being discussed gratis. By this act provision is made for medical attendance and medicines, being part of the system of pauper-relief, and for the education of pauper children. It is provided that, for the purposes of the act, parishes may be united into 'combinations.' By a special clause, nothing in the act is to be construed as entitling the able-bodied to relief, and their claim is thus left in the state of doubt in which it stood before the passing of the act. Men deserting their wives and children are made liable to punishment as vagrants, a provision which it is hoped may afford a remedy to a defect which has long characterised the law of Scotland—the absence of any means by which deserted wives can make effectual claims on their husbands for sustenance to themselves and their children, without a regular action in the court of session. By the new act, a new and more specific mode of apportioning the assessment between landed and other property has been at-

tempted to be established, but this provision is already a fruitful source of dispute and litigation. The time necessary to acquire an industrial settlement is increased from three to five years.

POPE (*Papa*, in Latin), is the title assumed by the bishop of Rome as head of the Roman Catholic Church. The word papa, or papas, meaning 'father,' is used by the Greeks to denote a presbyter. Gregory VII., in a council held at Rome, A.D. 1076, decreed that the title Papa should be given only to the bishop of Rome, as a mark of superior respect.

There are three offices or dignities united in the person of the Roman pontiff. He is—1, the primate or head of the Roman Catholic world; 2, he is bishop of Rome and metropolitan of its province; 3, he is the temporal sovereign of the Papal State. His authority and the manner of his administration in the last-mentioned capacity are described under PAPAL STATE.

Considered as pontiff and primate of the Roman Catholic church, the pope has a very extensive spiritual authority over the members, both clerical and lay, of that communion. The limits of this authority are however variously defined by Roman Catholic theologians. As for the Protestant and Reformed churches, they do not acknowledge any authority or jurisdiction in the pope, except over his own diocese as bishop of Rome, or at most over the other dioceses of the province of Rome as metropolitan. The Greek, Armenian, Jacobite, and Nestorian churches likewise disclaim his authority. Several Roman Catholic writers have endeavoured to trace the growth of the supremacy of the Roman see over the churches of the West, which supremacy they assert was once limited to the provinces which constituted, under the Christian emperors, successors of Constantine, the vicariate of Rome; others, on the contrary, contend that the bishop of Rome was by right the metropolitan of the whole West, if not of the whole Roman Empire. Gregory I. (the Great) however disclaimed the title of Œcumenic or universal bishop, and in token of humility assumed that of 'Servus Servorum Domini,' the 'Servant of the Servants of the Lord,' which his successors have continued to place at the head of their briefs and decretals.

In his quality of bishop of Rome, the pope delegates his authority as ordinary to a prelate called Vice-Gerente, who is generally a bishop in partibus. In his quality of metropolitan of the province of Rome, he has under him the bishops of Ostia and Velletri, of Porto and Santa Rufina, of Sabina, of Frascati, of Albano, and of Palestrina. As primate of the Roman Catholic church, he has under him the following sees:—In the Papal state, 8 archbishops and 59 bishops; in Tuscany, 3 archbishops and 17 bishops; in the kingdom of the Two Sicilies, 23 archbishops and 73 bishops; in the Sardinian monarchy, 7 archbishops and 34 bishops; in the duchy of Parma, 4 bishops; in the duchy of Modena, 4 bishops; in the duchy of Lucca, 1 archbishop; in the Austrian empire, 13 archbishops and 71 bishops; in the rest of Germany, 5 archbishops and 20 bishops; in Switzerland, 4 bishops; in Belgium, 1 archbishop and 5 bishops; in France, 14 archbishops and 66 bishops; in Spain, 8 archbishops and 49 bishops; in Portugal, 3 archbishops and 14 bishops; in Russian Poland, 5 archbishops and 13 bishops, of whom 2 archbishops and 3 bishops belong to the united Greek church; in Ireland, 4 archbishops and 23 bishops; in the states of Spanish America, 6 archbishops and 35 bishops; in Brazil, 1 archbishop and 10 bishops; in the Spanish colonies, 1 archbishop and 7 bishops; in the Portuguese colonies, 2 archbishops and 10 bishops; in Hayti, 1 bishop; in the French settlement of Algiers, 1 bishop; in Canada, 2 bishops; in the other English colonies and dependencies, 2 archbishops and 2 bishops; in the United States, 1 archbishop and 11 bishops. (Serrestori, 'Statistica d'Italia.') In England and other Protestant countries, the vicars apostolic exercise the episcopal functions over that part of the community which follows the Roman Catholic faith.

For the manner in which the pope carries on the spiritual government of this extensive flock, see ROMAN CATHOLIC CHURCH and CONCORDAT. The form of election of the pope is given under CONCLAVE. Notices of the most distinguished of the popes will be found under their respective names; all however are included in the following list, which is chiefly founded on Petau's 'Rationarium Temporum;' but the chronology of the earlier popes is often obscure, and the dates are uncertain.

According to the Roman Church, the apostle St. Peter was the first bishop of Rome, and suffered martyrdom A.D. 57. He is said to have entrusted in his lifetime the see of Rome to Linus, a native of Etruria, who died in the year 68. Linus was succeeded by Clemens Romanus, who died about A.D. 100. Some chronologists place Anacletus or Cletus between Linus and Clemens, whilst others place him after Clemens. [CLEMENT I.] Evaristus, a native of Palestine, is recorded as bishop of Rome about the year 100, and was succeeded by Alexander I. about 109. Alexander I. was succeeded by Sixtus I., a Roman, in 119. Sixtus was succeeded, in 127, by Telesphorus, a Greek, who is said by Irenæus to have suffered martyrdom about the year 138. Hyginus, a native of Athens, succeeded Telesphorus, and was succeeded, in 142, by Pius I., a native of Aquileia. Pius was succeeded in 151 by Anicetus, a native of Syria. Anicetus was succeeded in 161 by Soterus, who was succeeded in 170 by Eleutherus, in whose time Irenæus visited Rome. Eleutherus was succeeded, in 185, by Victor I., a native of Africa. To Victor succeeded Zephyrinus, A.D. 197. Zephyrinus was succeeded in 217 by Kallistus or Calixtus I., who governed the see of Rome through a period of comparative tranquillity under the tolerant reign of Alexander Severus. Calixtus was succeeded in 222 by Urban I. Pontianus succeeded Urban in 230, and died in exile. He was succeeded in 235 by Antherus, who a few months after his election suffered martyrdom, during the persecution of the Christians by Maximinus. He was succeeded by Fabianus, A.D. 236. Fabianus was succeeded, in 252, by Cornelius,

whose election was contested by Novatianus, a Roman presbyter, who is the first antipope recorded in history. Cornelius was succeeded in 253 by Lucius I. To Lucius succeeded Stephen I. in the same year. Stephen had a warm controversy with Cyprian, bishop of Carthage. Stephen was succeeded by Sixtus II. in 257. Sixtus was succeeded by Dionysius, in 259. It was under Dionysius that the heresy of Paul of Samosata broke out. Dionysius was succeeded by Felix I. in the year 270. Eutychianus succeeded Felix in 275, and was succeeded in 283 by Caius, who is said to have been a relative of the emperor Diocletianus. Caius was succeeded in 296 by Marcellinus. Marcellinus died in 305, and after a vacancy of three years, Marcellus was elected in 308. Eusebius succeeded Marcellus in 310, who was succeeded in the same year by Melchiades, in whose time Constantine defeated Maxentius and took possession of Rome. Melchiades was succeeded in 314 by Sylvester I. during whose pontificate Constantine convoked the great council of Nicæa, to which Sylvester sent two priests as his legates. In that council it was decreed that the bishop of Rome should be primate over the churches of those provinces which in civil matters were subject to the jurisdiction of the 'Vicarius Urbis,' or imperial vicar of Rome.

Date of election.
A.D.
336. Marcus, a native of Rome, succeeded Sylvester I.
337. Julius I., a native of Rome.
352. Liberius, a Roman, banished by Constantius.
Felix, substituted by Constantius, is considered by most as an intruder.
366. Damasus I., a Spaniard, elected after the death of Liberius.
Ursicinus, antipope against Damasus.
384. Siricius, a Roman, succeeded Damasus.
398. Anastasius I., a Roman.
401. Innocent I., native of Albano.
417. Zosimus, a Greek.
418. Boniface I., a Roman.
422. Celestinus I., a Roman.
432. Sixtus III., a Roman.
440. Leo I. of Rome, called the Great.
461. Hilarius, a native of Sardinia.
467. Simplicius, a native of Tibur.
483. Felix III. of Rome.
492. Gelasius I. of Rome.
496. Anastasius II. of Rome.
498. Symmachus, a native of Sardinia.
514. Hormisdas, a native of Frusino.
523. John I., a Tuscan.
526. Felix IV., a native of Beneventum.
530. Boniface II. of Rome.
532. John II. of Rome.
535. Agapetus I. of Rome.
536. Sylverius, a native of Campania.
540. Vigilius, a Roman.
555. Pelagius I., a Roman.
560. John III. of Rome.
574. Benedict I. of Rome.
578. Pelagius II. of Rome.

590. Gregory I. of Rome, styled the Great.
604. Sabinianus, a native of Tuscany.
607. Boniface III. of Rome.
608. Boniface IV., a native of Abruzzo.
615. Deusdedit or Deodatus I. of Rome.
619. Boniface V., a Neapolitan.
625. Honorius I., a native of Capua.
638. Severinus of Rome.
640. John IV., a native of Dalmatia.
641. Theodorus, a Greek.
649. Martin I. of Tudertum.
654. Eugenius I. of Rome.
657. Vitalianus, a native of Signia.
672. Deusdedit II. of Rome.
676. Domnus I. of Rome.
678. Agathon, a Sicilian.
682. Leo II., a Silician.
684. Benedict II. of Rome.
685. John V., a native of Syria.
686. Conon, a native of Thrace.
687. Sergius I., a native of Palermo.
701. John VI., a native of Greece.
705. John VII., a native of Greece.
708. Sisinius, a native of Syria.
708. Constantine, a Syrian.
715. Gregory II. of Rome.
731. Gregory III., a Syrian.
741. Zacharias, a Greek.
753. Stephen II. died within a few days.
753. Stephen III. of Rome.
757. Paul I., a Roman.
763. Stephen IV., a Sicilian.
772. Adrian I., a Roman.
795. Leo III., a Roman.
816. Stephen V., a Roman.
817. Paschal I., a Roman.
824. Eugenius II., a Roman.
827. Valentinus, a Roman.
827. Gregory IV., a Roman.
843. Sergius II., a Roman.
847. Leo IV., a Roman.
Between Leo and his successor some chroniclers place JOAN.
855. Benedict III., a Roman.
858. Nicholas I., a Roman.
867. Adrian II., a Roman.
872. John VIII., a Roman.
882. Martin II., called by some Marinus I.
884. Adrian III., a Roman.
885. Stephen VI., a Roman.
891. Formosus, bishop of Porto.
Sergius, antipope, and after him Boniface, styled by some Boniface VI.
896. Stephen VII., a Roman.
897. Romanus, a Tuscan.
897. Theodorus II., a Roman.
897. John IX. of Tibur.
900. Benedict IV., a Roman.
903. Leo V., a native of Ardea.
Christopher, antipope.
904. Sergius III.
911. Anastasius III., a Roman.
913. Lando, a native of Sabina.
914. John X., a Roman.
928. Leo VI., a Roman.
929. Stephen VIII., a Roman.
931. John XI., son of Sergius III.

936. Leo VII., a Roman.
939. Stephen IX., a Roman.
943. Martin III., called by some Marinus II.
946. Agapetus II.
956? John XII., Ottaviano Conti.
He was the first who changed his name on his assumption.
963. Leo VIII., styled antipope by some.
964. Benedict V., a Roman.
965. John XIII., a Roman.
972. Benedict VI., was killed in a tumult.
973. Domnus II., a Roman.
974. Benedict VII., of the Conti family.
983. John XIV., put to death by Franco, antipope, styled Boniface VIII.
985. John XV., a Roman.
986. John XVI., a Roman.
996. Gregory V., a German.
999. Sylvester II., Gerbert, native of Auvergne.
1003. John XVIII., a Roman.
1009. Sergius IV., a Roman.
1012. Benedict VIII., of Tusculum.
1024. John XIX. of Rome.
1033. Benedict IX., deposed.
Sylvester, bishop of Sabina, antipope.
1044. Gregory VI. of Rome, abdicated.
1047. Clement II. of Saxony (bishop of Bamberg).
1048. Damasus II. (Poppo, bishop of Brixen.)
1049. Leo IX., bishop of Toul.
Final separation of the Greek church.
1055. Victor II., bishop of Eichstadt.
1057. Stephen IX., abbot of Monte Casino.
1058. Benedict X., abdicated.
1059. Nicholas II. of Burgundy.
1061. Alexander II. of Milan.
1073. Gregory VII., Hildebrand, a monk.
Guibert, antipope, assumed the name of Clement III.
1086. Victor III., a native of Beneventum.
1088. Urban II., a native of France.
1099. Paschal II., a native of Tuscany.
Albert and Theodoric, antipopes.
1118. Gelasius II., a native of Caieta.
1119. Calixtus II., a native of Burgundy.
1124. Honorius II., Cardinal Lamberto.
1130. Innocent II., a Roman.
Anacletus, antipope.
1143. Celestinus II., a Tuscan.
1144. Lucius II. of Bologna.
1145. Eugenius III. of Pisa.
1153. Anastasius IV., a Roman.
1154. Adrian IV., an Englishman.
1159. Alexander III., Cardinal Orlando Bandinelli of Siena. Cardinal Octavian, antipope, by the name of Victor. Cardinal Guido, antipope, by the name of Paschal. Calixtus, antipope.
1181. Lucius II., Cardinal Ubaldo of Lucca.
1185. Urban III., Uberto Crivolli.
1187. Gregory VIII. of Beneventum.
1188. Clement III., Paul, bishop of Prænestc.
1191. Celestinus III., Hyacinthus, a Roman.
1198. Innocent III., Cardinal Lotharius of Signia.
1216. Honorius III., Cardinal Savelli of Rome.
1227. Gregory IX., Cardinal Hugo of Anagni.
1241. Celestinus IV. of Milan.
1242. Innocent IV., Cardinal Fieschi of Genoa.

1254. Alexander IV., Rinaldo Conti of Anaqui.
1261. Urban IV., a Frenchman.
1265. Clement IV., a native of Languedoc.
1272. Gregory X., Tebaldo Visconti of Piacenza.
1276. Innocent V., a native of the Tarentaise.
1276. Adrian V., Ottobono Fieschi of Genoa.
1276. John XXI. of Lisbon.
1277. Nicholas III., Cardinal Orsini of Rome.
1281. Martin IV., a Frenchman.
1285. Honorius IV., Cardinal Savelli of Rome.
1288. Nicholas IV., Cardinal Jerome of Ascoli.
1294. Celestinus V., abdicated.
1295. Boniface VIII., Cardinal Caetani of Anagni.
1303. Benedict XI., Cardinal Nicholas of Treviso.
1305. Clement V., Bertrand of Bordeaux, removed the Papal See to Avignon.
1316. John XXII., James of Cahors in France.
Nicholas, antipope, in Italy.
1334. Benedict XII., a Frenchman.
1342. Clement VI., of Limoges in France.
1352. Innocent VI., Stephen Aubert of Limoges.
1362. Urban V., Wm. Grimoard, a Frenchman.
1370. Gregory XI., Peter Roger, a Frenchman, restored the Papal See to Rome.
1378. Urban VI., a Neapolitan.
Clement at Avignon, antipope.
1389. Boniface IX., Peter Tomacelli of Naples.
Pedro de Luna, a Spaniard, antipope.
1404. Innocent VII., Migliorati of Sulmona.
1406. Gregory XII., Angelo Corrari of Venice, abdicated at Constance.
1409. Alexander V., Peter Philargius of Candia.
1410. John XXIII., Cardinal Cossa, deposed by the Council of Constance.
1417. Martin V., Otho Colonna, a Roman.
1431. Eugenius IV., Condulmero, a Venetian.
Felix, antipope.
1447. Nicholas V., Cardinal Thomas, of Sarzana.
1455. Calixtus III., Alfonso Borgia, a Spaniard.
1458. Pius II., Æ. S. Piccolomini of Siena.
1464. Paul II., Peter Barbo of Venice.
1471. Sixtus IV., F. della Rovere, a Genoese.
1485. Innocent VIII., G. B. Cibo, a Genoese.
1492. Alexander VI., R. L. Borgia, a Spaniard.
1503. Pius III., F. T. Piccolomini.
1503. Julius II., Julian della Rovere, a Genoese.
1513. Leo X., Giovanni de' Medici.
1522. Adrian VI. of Utrecht.
1523. Clement VII., Giulio de' Medici.
1534. Paul III., Alessandro Farnese of Rome.
1550. Julius III., Giovan Maria Giocci of Rome.
1555. Marcellus II., Cardinal Cervini.
1555. Paul IV., G. P. Carafla, a Neapolitan.
1559. Pius IV., G. A. Medichini of Milan.
1566. Pius V., Michele Ghislieri of Alessandria.
1572. Gregory XIII. of Bologna.
1585. Sixtus V., of Montalto in the Marca d'Ancona.
1590. Urban VII., G. B. Castagna, a Genoese.
1590. Gregory XIV, Nicolo Sfrondati of Milan.
1591. Innocent IX., G. A. Facchinetti of Bologna.
1592. Clement VIII., Ippolito Aldobrandini, a native of Fano.
1605. Leo XI., Alessandro de' Medici of Florence.
1605. Paul V., Camillo Borghese of Rome.
1621. Gregory XV., A. Ludovici of Bologna.
1623. Urban VIII., M. Barberini, a Florentine.

1644. Innocent X., G. B. Pamfili of Rome.
1655. Alexander VII., Fabio Chigi of Siena.
1667. Clement IX., Giulio Rospigliosi of Pistoia.
1670. Clement X., Emilio Altieri of Rome.
1676. Clement XI., B. Odescalchi of Como.
1688. Alexander VIII., P. Ottoboni of Venice.
1691. Innocent XII., A. Pignatelli of Naples.
1700. Clement XI., G. F. Albani of Urbino.
1721. Innocent XIII., M. A. Conti of Rome.
1724. Benedict XIII., V. M. Orsini of Rome.
1730. Clement XII., Lorenzo Corsini of Florence.
1740. Benedict XIV., P. Lambertini of Bologna.
1758. Clement XIII., Carlo Rezzonico of Venice.
1769. Clement XIV., Gian Vincenzo Ganganelli.
1775. Pius VI., Angelo Braschi of Cesena.
1800. Pius VII., G. B. Chiaramonti of Cesena.
1823. Leo XII., A. della Genga, of Romagna.
1829. Pius VIII., Cardinal Castiglioni of Cingoli.
1831. Gregory XVI., Mauro Capellari.
1846. Pius IX., Cardinal Ferretti of Imola.

POPE, ALEXANDER, was born in London, May 22, 1688. His parents were Roman Catholics, and his father kept a linen-draper's shop in the Strand. In his early years his father retired to Binfield in Windsor Forest, and here Pope, while yet a child, became a poet. The 'Pastorals' were composed when he was sixteen, but not published till he was twenty-one (1709), in Tonson's 'Miscellany.' He next produced the 'Essay on Criticism,' and not long after appeared the 'Rape of the Lock,' and 'The Temple of Fame,' a partial imitation of Chaucer. In 1713 he published 'Windsor Forest,' and soon after the proposals for a subscription to a version of the 'Iliad.' The whole work was completed between his 25th and 30th year. In the translation of the 'Odyssey,' Pope was helped by Broome and Fenton. Pope translated twelve books, Broome eight, and Fenton four.

In 1728 he published the 'Dunciad,' in three books, and in 1733 the 'Essay on Man,' which however was not avowed till the next year, when he wrote his 'Characters of Men, or Moral Essays.' These were preceded and followed by 'Imitations of Horace,' and in 1742 the list of his poems concludes with a new edition of the 'Dunciad,' in four books, in which Cibber takes the place of Theobald, the original hero. About this time his health declined, and on May 30, 1744, he died of asthma and decay of nature.

Pope was short and deformed. It is surprising that he should have lived so long as he did, having both physical infirmity and hard study to contend against, with the addition of a violent temper, over which he had so little control that he could not avoid showing anger by the very contortions of his countenance. Pope's merits as a poet have been the subject of much discussion, but, whatever may be his claims to the title, or whatever rank he may be assigned by favourable or unfavourable critics, his popularity was and is very great. To this popularity the dazzling point of his satires and didactive poems and his harmonious versification have no doubt greatly contributed. These merits are uncontested, and for his others his readers must decide for themselves.

Pope's works, with a commentary by Warburton, were published in 1751-60, London, 9 vols. 8vo. There is an edition by Roscoe, London, 10 vols. 8vo. There have been several other editions.

POPERY. [Roman Catholic Church.]

POPERINGEN. [Flanders, West.]

POPLAR. [Salicaceæ.]

POPPY. [Papaver.]

POPULATION. [Census.]

POPULUS. [Salicaceæ.]

PORCELAIN. [Pottery and Porcelain.]

PORCELLA'NIANS, a tribe of Anomurous Crustaceans, placed by M. Milne Edwards next to the Pagurians, and immediately preceding the section of Macrurous Decapods. Under this tribe are comprehended the genera *Porcellana*, Lamarck; *Ægleа*, Leach; *Megalops*, Leach; and *Monolepis*, Say. (Milne Edwards's *Histoire Naturelle des Crustacés.*)

PORCH (from the Latin *porticus*), a general term for any projection forming a covered space immediately before the entrance to a building, open in front, and more or less inclosed at its sides. The distinction between a porch and a portico is, that, however important it may be as a feature, the former appears only a subordinate part of the building to which it is attached; whereas the other [Portico] may be the whole of a front. As far as we are aware, the only instance of a porch in Greek architecture was that in the octagonal structure called the Tower of the Winds, at Athens. In Norman architecture, the porches or portals are little more than a modification of the similar features in Byzantine and Lombardic architecture. Of porches, strictly so called, there are few instances, either in Norman or Gothic architecture; there are often however spacious portals, which do not advance beyond the general plan of the building in front, but form entrances, deeply recessed and inclosed within the lower part of the structure. In ancient English domestic architecture, porches, properly so called, are frequent.

PORCUPINES, *Hystricidæ*, a family of Rodent Quadrupeds.

The genus *Hystrix* of Linnæus embraces those Rodents whose covering consists, for the most part, of a kind of offensive and defensive armour, in the shape of spines or quills instead of hairs.

Cuvier, who places the Porcupines between the genus *Myopotamus* [Coypou] and the genus *Lepus*, observes that they are to be recognised at the first glance by the stiff and pointed spines with which they are armed, after the manner of the Hedgehogs among the Carnassiers. Their molars are, he proceeds to state, four in number, with a flattened crown, variously modified by layers of enamel, which leave deep intervals; their tongue is rough with spiny scales; their clavicles are too small to be applied to the sternum and omoplate, and are only suspended by ligaments. Many of them live in burrows, and have much the habits of rabbits. Their grunting voice, joined to their large and truncated muzzle, has caused them to be compared to the Hog, whence their French name *Porcépic*, and their English name of Porcupine.

Cuvier divides the group into, 1, the Porcupines properly so called (*Hystrix cristata*, Lin.); 2,

Atherura, Cuv. (*Hystrix fasciculata*, Lin.); 3, *Les Ursons* (*Erétisons*, F. Cuv.; *Hystrix dorsata*, Lin.); and, 4, *Les Coendous* (*Synæthcres*, F. Cuv.); *Hystrix prehensilis*, Lin.; and *Hystrix insidiosa*, Licht.).

Mr. Waterhouse, in his tabular view of the distribution of the Rodentia, laid before the Zoological Society of London in November, 1839, makes the subfamily *Hystricina* consist of the *Hystricidæ*, the *Octodontidæ*, the *Chinchillidæ*, and the *Caviidæ*. To Europe and North Asia he gives one species of *Hystricidæ* (*Hystrix*). To North America one (*Erethizon*). To Africa one (*Hystrix*). To India and the Indian Islands two—one *Hystrix* and one *Atherura*. To South America and the West Indian Islands he gives five, viz. three of *Cercolabes* and two of *Synætheres*.

The common Porcupine (*Hystrix cristata*) is the ὕστριξ (Hystrix) of Aristotle and the Greeks; *Hystrix* of the Romans; *Istrice* of the Italians; *Porcépic* of the French; *Stachelschwein*, *Dornschwein*, and *Porcopick* of the Germans.

Porcupine (*Hystrix cristata*).

The Porcupine, when full grown, is about two feet in length, the longest spines exceeding a foot. The usual position of the spines is lying nearly flat upon the body, with their points directed backwards. When the animal is excited they are raised so as to be almost at right angles with the body, and then present a very formidable appearance. In its habit it is nocturnal, inhabiting deep burrows; whence it emerges at night to seek for food, consisting chiefly of roots, tender leaves, fruits, and other vegetable matters. Its geographical range is considerable; it is found throughout Africa, and eastern Europe generally, and also in western Asia. In Italy, according to Agricola, it is a naturalised importation from the East and Africa. We need hardly say that the story of the porcupine darting its spines at its adversary is fabulous, as are also other marvellous details related by the older writers.

A distinct species (*Hystrix leucurus*, Sykes) inhabits India. Mr. Hodgson notes this species among the mammalia of Nepaul as inhabiting the central and lower regions.

Of the genus *Atherura* we know of only one species, *Atherura cristata* (*Hystrix fasciculata*, Shaw; *Le Porcépic à Queue en Pinceau*, Buffon). In this species the tail is long, but not prehensile. Locality, Celebes, Asia, Malay Peninsula, Isles of the Indian Archipelago, Sumatra, and Fernando Po. Habits, nocturnal. (Bennett's 'Gardens and Menagerie of the Zoological Society.')

The genus *Erethizon* affords one species, a native of North America (*E. dorsatum*), commonly termed the Canada Porcupine.

This is the *Cavia Hudsonis* of Klein; *Hystrix Hudsonius* of Brisson; *Hystrix pilosus* of Catesby; *Hystrix dorsata* of Linnæus; *L'Urson* of Buffon; *Canada Porcupine* of Forster, Pennant, and others.

Habits, arboreal; its retreat is generally among the roots of an old tree. It is sluggish and indolent, but extremely irritable, and its spines cause injury to dogs or other animals which attack it. When disturbed, it makes a whining or mewing noise. It pairs at the latter end of September, and brings forth two young ones in April or May. Its flesh, which tastes like flabby pork, is relished by the Indians, but is soon nauseated by Europeans. The bones are often deeply tinged with a greenish-yellow colour. Like other animals which feed on coarse vegetable substances, it is much infested by intestinal worms. The quills or spines are dyed of various bright colours by the native women, and worked into shot-pouches, belts, shoes, and other ornamental articles of dress.

In the genus *Synætheres* the muzzle is large and naked, the head convex in front; the tail very long, naked at the end, and prehensile, like that of an Opossum or Spider-Monkey. Feet with only four toes, armed with claws.

Example.—The Brazilian Porcupine (*Synætheres prehensilis* (*Hystrix prehensilis*, Linn.).

The Brazilian Porcupine appears very much to resemble the Canada Porcupine in its habits, living in woods, sleeping by day, and feeding on fruits, &c., by night. Marcgrave states that its voice is like that of a sow. The quills are said to have the same penetrating and destructive quality as those of the Canadian species. It is a sluggish animal, climbing trees very slowly, and holding on with its prehensile tail, especially in its descent. It grows very fat, and the flesh is said to be white and well-tasted.

PORDENO'NE, GIOVANNI ANTO'NIO LICI'NIO, or LICINO, called *Il Pordenone*, was born at Pordenone in Friuli in 1484. He was an able colourist, and painted in oil and in fresco. His most splendid work in oil is the altarpiece of Santa Maria dell Orto, at Venice, representing a S. Lorenzo Giustiniani, surrounded by other saints, among whom are St. John the Baptist and St. Augustin. The frescoes of Pordenone are spread over the towns and castles of Friuli; but the best preserved are at Piacenza and Cremona. He was highly esteemed by the Emperor Charles V. He died in 1540, as it was suspected, of poison. It must be observed that he adopted the name of *Regillo*.

There are some of Pordenone's pictures in England—at Hampton Court and elsewhere.

PORES. [Skin.]

PORES OF PLANTS. [Stomates.]

PORISM (πόρισμα). An intermediate class of

propositions, between problems and theorems, was, as we are informed by Pappus, distinguished by the ancient geometers under the name of porisms. Much discussion has taken place on the sense in which the Greek geometers really used this word.

POROSITY is that condition of material bodies which consists in the discontinuity of their molecules, the intervals between these being called pores (from πόρος, a passage). Porosity is a property common to all the bodies of nature, at least we know none in which the particles are contiguous to one another. In some, as sponge and cork, the pores are visible to the eye, and in others they may be rendered so by the aid of a microscope. In bodies whose pores are not thus manifest, the existence of the intervals between the molecules is proved by various circumstances. Thus water or mercury being contained in an open vessel of wood over the exhausted receiver of an air-pump will, by the pressure of the atmosphere, be forced through the wood, and fall thence in a shower: liquids also are frequently filtered by being made to pass through the pores of paper; and in the Florentine experiment, for determining whether or not water is compressible, the fluid was by pressure forced through the pores of the vessel of gold in which it was contained. Again, the porosity of bodies is inferred from their elasticity, and the sounds which are heard when the molecules are in a state of vibration: also, in transparent bodies (and the most dense metals are, when rendered sufficiently thin, found to be transparent), it is inferred from the fact that the particles of light pass through them, or that the vibrations of an æthereal fluid take place among the molecules. Finally, the porosity of bodies is proved from the fact that they suffer contraction of volume by being exposed to cold and by mechanical compression, since such contractions can only take place in consequence of the particles being forced closer together than they are in the usual states of the bodies.

PORPHY'RIUS was born A.D. 233, either at Tyre, whence he is called Tyrius, or at Batanæa (Basan), a town of Syria, whence he is called Bataneótes. Longinus, his preceptor, changed his Syriac name 'Melech' (king) into that of Porphyrius 'one clothed in purple.' It was at Athens where Porphyrius studied under Longinus. He was afterwards a pupil of Plotinus at Rome. He lived some time in Sicily, where he is said to have written his fifteen books against the Christians. Porphyrius died at Rome about A.D. 304.

Porphyrius wrote many works in Greek, sixty-one according to Fabricius. There is yet no complete edition of his extant works. There have been published his four books 'On Abstinence from Animal Food,' his 'Life of Pythagoras,' his 'Introduction to the Categories of Aristotle,' prefixed to the edition of the Organon and some other works.

PO'RPHYRY. A large number of rocks of igneous origin, both very ancient and comparatively modern, are thus designated; yet this use of the term is neither accurate nor convenient. Properly speaking, a particular structure is indicated by it, and not a definite rock or family of rocks.

Felspar of a granular texture, without crystals imbedded, is Claystone; with imbedded crystals of felspar it is Porphyry. Hornblende, mixed with uncrystallised felspar, makes some Greenstones; with imbedded crystals of felspar this becomes Greenstone-Porphyry. Hence, by this mode of designation, we have Pitchstone-Porphyry, Greenstone-Porphyry, Basaltic-Porphyry, Felspar-Porphyry, and even so vague a term as Trap-Porphyry; and, on the other hand, more correctly, Porphyritic Pitchstone, Porphyritic Claystone, Porphyritic Greenstone, Porphyritic Basalt, and Porphyritic Granite.

Among volcanic rocks Porphyritic Trachytes are common. Fine examples of Porphyry (crystals of felspar in a base of uncrystallised felspar) occur in Scotland at Inverarn, and on Ben Nevis.

PORRI'GO, *Ringworm*, is a pustular and contagious disease of the scalp, or, in some rare cases, of other parts where there is much hair. M. Biett describes two varieties of it under the names of *P. favosa* and *P. scutulata*. Dr. Willan described many more varieties, but he included in this name other widely different diseases.

Porrigo favosa consists of an eruption of small flat yellow pustules, with depressions at their centres, distinct or clustered, and which soon concrete into bright yellow honey-coloured scabs, on the surface of which the depressions of the centres of each pustule are usually still visible. After some time the scabs become thick and white; and drying, split and break off. Sometimes however they remain long adherent, the skin beneath them ulcerating, and the discharge oozing through them. The hair of the parts affected is always much loosened, and often falls off spontaneously; and, when it grows again, is weaker and lighter in colour than before.

It is one of the most obstinate diseases of the skin, and often lasts for months or years. The first measure for its cure is to cleanse the head completely with poultices or soap and water, and to have the hair cut very close. The dead hair and scabs must then be cleaned off as fast as they form. The medicines that promise the speediest success are lotions with sulphuret of potash, or slightly acidulated, or with alkalis or their carbonates. Internal medicines must be employed if there be any symptoms indicating their necessity; but generally they are useless.

Porrigo scutulata, which is more commonly termed *Ringworm* than the preceding, appears in the form of circular red patches, with numerous minute yellow pustules with depressed centres, out of which a hair usually projects, and which are attended by great itching. The fluid contained in the pustules dries up soon after they are formed, and, by coalescing, they produce a scab over the whole diseased surface. Subsequently successive crops of new pustules form around the margin of the scab, which is increased by their drying, and thus the disease may spread over the greater part of the scalp by the meeting and coalescing of the patches, which were at first isolated. The hair usually falls off from the part affected, or is so loosened that it may be pulled out without pain. The treatment is the same as for *Porrigo favosa*.

PORSE'NA, or PORSE'NNA, a Lar (or lord) of the Etruscan town of Clusium. When the Tarquinii, in the second year after their expulsion from Rome (508 B.C.), had been defeated near the forest of Arsia, they sought the assistance of Lar Porsena. According to Livy, the Etruscan prince immediately marched with his army against Rome, and he was only prevented from entering the city by the bravery of Horatius Cocles, who defended the Pons Sublicius, until his companions had time to retreat across it, and break down the part which was nearest to the city. Cocles then threw himself into the river, and swam across to his friends. Porsena now blockaded the city, which suffered from famine, when a noble youth, named C. Mucius, entered the enemy's camp with the intention of killing Porsena, but, mistaking the secretary for his master, he killed him. Porsena threatened to burn Mucius alive, if he did not discover his accomplices, upon which the Roman thrust his right hand into a fire, which was burning on an altar, and held it there. This intrepidity both alarmed Porsena, and raised his admiration of the young man, who told him that three hundred noble Romans had bound themselves by oath to kill him. Porsena upon this made peace with the Romans, and left the territory. This romantic story does not however contain the truth, for the fact that the city was taken by Porsena is affirmed by Tacitus ('Hist.' iii. 72); and there are other notices in ancient writers, which confirm this statement.

The rest of the history of Porsena is rather more doubtful than that which has been told. If he took Rome, he probably did not hold it long, and an old symbolical custom of selling the goods of king Porsena (Liv. ii. 14) seems to be intended as a memorial of the king being ejected or making a hasty retreat from the city.

PORSON, RICHARD, was born at East Ruston, Norfolk, on the 25th of December, 1759. His father, Mr. Huggin Porson, was the parish clerk of his native place. At nine years of age Richard Porson was sent to the village school, and three years afterwards he received gratuitous instruction in Greek and Latin from Mr. Hewitt, the vicar of the parish, whose attention had been directed to the boy's diligence and abilities. A neighbouring gentleman, Mr. Norris of Grosvenor Place, after examining the boy, sent him to Eton, where he was placed on the foundation at that gentleman's expense, in August 1774. Porson remained at Eton three years. His friend Mr. Norris died while he was at Eton, but Sir George Baker, the eminent physician, and others, sent Porson to Trinity College, Cambridge, in 1777. He was not elected to King's College, Cambridge, a circumstance not owing to Porson's want of scholarship or to any other cause than the rule by which boys are selected from Eton to fill up the vacancies in King's College, Cambridge. (See article 'Porson,' 'Penny Cyclopædia,' and the Note.) In 1781 Porson gained a university scholarship on Lord Craven's foundation at Cambridge; and on taking his degree in the following year he obtained the first Greek medal. In October, 1782, he was elected a fellow of Trinity College, Cambridge. As he did not take orders, he lost his fellowship by lapse of time, in 1791; but in 1793 he was elected professor of Greek in the University of Cambridge. The emolument of the professorship is small; but Mr. Cracherode and some other liberal friends had purchased for him an annuity of 100*l*.

In 1795 Porson married Mrs. Lunan, a sister of Perry, the editor of the 'Morning Chronicle,' who died about two years after their marriage. Probably this circumstance and the want of a comfortable home contributed to bring on those habits of intemperance in which Porson indulged; but the writer of this brief notice has been informed by an old friend of Porson's that he early suffered from asthma, which prevented him from sleeping regularly, and thus he was driven to sitting up late and to intemperate habits. On the establishing of the London Institution, Porson was made head librarian with a salary of 200*l*. a year. He died after a short illness on the 25th of September, 1808, and was buried in Trinity College Chapel, where a monument has been raised to his memory, and a bust by Chantrey has been placed.

Porson's published works are few. He made a critical edition of four plays of Euripides, which is well known: his edition of the Lexicon of Photius and his 'Adversaria' were published after his death. He wrote a correct and vigorous English style, of which his 'Letters to Travis' are a proof. His merit must not be judged by the little that he did. He was a most exact and profound Greek scholar, and in the department of verbal criticism probably the first of all modern scholars. He had a wonderful memory, unwearied diligence, good taste, and unrivalled acuteness in deducing the true reading of a passage of a Greek author from varying and corrupted texts. His emendations were not mere guesses at what an ancient author might have written, but in many cases a certain conclusion as to what he did write. His reading extended over the whole range of Greek literature, though his labour was mainly directed to the poets. He was a good French scholar, and well versed in the literature of his country. If those who have followed in his steps of criticism have often employed themselves about trifles, the fault is not in their master, who did well all that he attempted, and might have done much more if circumstances had been favourable.

PORT-ELIZABETH. [CAPE OF GOOD HOPE]

PORT-LOUIS. [MAURITIUS; MORBIHAN.]

PORT-ROYAL. [JAMAICA.]

PORT ROYAL DES CHAMPS, a celebrated convent of nuns, which was situated not far from Versailles, on the left of the high road leading from Rambouillet to Chartres. The site of the convent is a deep valley, inclosed by hills. This establishment was founded about A.D. 1204; the nuns were of the order of St. Bernard, and had their own abbess. In 1223 the pope gave the convent power to receive lay persons who wished to live in permanent seclusion without binding themselves by vows.

The important period of the history of Port Royal begins with the appointment of Angelica Arnauld, sister of the controversialist Antoine Arnauld. Angelica was made abbess while she was still a child, and when she attained to womanhood, she formed a plan for the reformation of the discipline of her convent. In 1633 Angelica and her nuns settled themselves in a spacious house in Paris, in the Rue du Boulai. The new convent was called Port Royal de Paris. The building of Port Royal des Champs, which continued to belong to the same monastic institution, was occupied afterwards by several pious and learned men who wished to live a secluded life according to the spirit of the papal bull of 1223, and who were styled 'les Solitaires de Port Royal.' This was the origin of the famous school of Port Royal. One of the first of these recluses was Claude Lancelot, the grammarian. He was joined by Antoine le Maistre, a distinguished advocate, and his brother Louis Isaac le Maistre de Sacy, by Antoine Arnauld, brother of the abbess Angelica, by Pierre Nicole, Nicolas Fontaine, Thomas du Fossé, and others. Most of them were friends and disciples of Du Vergier d'Hauranne, abbot of St. Cyran, well known for his controversies with the Jesuits, and his connection with Jansenius, who had been his school-fellow at Louvain. Le Maistre de Sacy was for a time spiritual director of the nuns of Port Poyal de Paris. Lancelot and his friends established a school at Port Royal des Champs for the better religious, moral, and scholastic instruction of a limited number of pupils. The school of Port Royal consisted of five classes of five pupils each. Lancelot, Arnauld, De Sacy, Nicole, Fontaine, and others, were the teachers, and they published in concert a number of school-books which have had a high reputation. The school of Port Royal flourished from 1646 to 1660. It formed many distinguished pupils: Racine and Tillemont were of the number. Among the school-books published for the use of that institution were the following: 1. 'Nouvelle Méthode pour apprendre la Langue Latine.' 2. 'Nouvelle Méthode pour apprendre la Langue Grecque.' 3. 'Jardin des Racines Grecques.' 4. 'Grammaire Générale.' 5. 'Elémens de Géométrie.' All these works were written conjointly by Lancelot, Arnauld, and Sacy.

The number of nuns and novices of Port Royal de Paris having greatly increased, the abbess Angelica Arnauld determined upon transferring part of them to Port Royal des Champs. Upon this the school of Port Royal was removed from the latter place to Paris, Rue St. Dominique, Faubourg St. Jacques, but after three years the teachers were restored to Port Royal des Champs, where they no longer occupied the monastic building, but a farm-house, called Les Granges, on the neighbouring hill.

In 1653 Pope Innocent I. condemned five propositions in the book of Jansenius, and Arnauld attempted to show that the propositions were not in the book of Jansenius, or that they had not the meaning that was attributed to them. This was the beginning of the troubles of Port Royal, which are tedious to read and to tell. In March, 1708, a bull of Clement XI. suppressed the convent of Port Royal des Champs, and gave the property to Port Royal de Paris. The convent of Port Royal was levelled to the ground by the order of Louis XIV. An elaborate history of Port Royal was published by Dr. Reuchlin, Hamburg, 1839.

PORT-WINE. [WINES.]

PORTA, BACCIO DELLA. [BACCIO DELLA PORTA.]

PORTA, GIAMBATISTA, born of a noble family at Naples, about 1550, applied himself early to the study of nature, and was deeply read in Aristotle, Pliny, and all the ancients who in any way treat of nature or describe the earth. A suspicion of his being addicted to unlawful superstitions, was the cause of his falling under the censure of the court of Rome, which prohibited the meetings at his house of the society called 'I Secreti,' which was accessible only to such as had made some new discoveries in physical science. Porta not only established private schools for particular sciences, but to the utmost of his power promoted public academies, and had no small share in establishing that of 'Gli Oziosi' at Naples. In his old age he composed dramas, both tragic and comic, which are now forgotten. He died at Naples, Feb. 4, 1615.

In spite of the absurdities that abound in Porta's works, he was of greater service to physical science than perhaps any of his contemporaries. To him we are indebted for the invention of the camera obscura, and also for a number of optical experiments. The most important invention that has been attributed to him is that of the telescope, but by the best judges this honour is still considered to be due to Galileo. [GALILEO.]

The following is a list of his principal works: —1, 'Perspectiva,' Rome, 1555, 8vo; 2, 'Magiæ Naturalis, sive de Miraculis Rerum Naturalium, Libri Viginti,' Naples, 1589, fol.; 3, 'De Furtivis Literarum Notis, vulgo de Zifaris,' Naples, 1563, 4to; 4, 'Phytognomonica Octo Libris contenta,' &c., Naples, 1583, and several times reprinted; 5, 'De Humanâ Physiognomoniâ,' Sorrento, 1586, fol.; and in Italian, Naples, 1508, fol., very frequently reprinted, and translated into different modern languages. There are also seven or eight others on similar subjects: 6, 'Villæ Libri Duodecim,' &c., Francof., 1592, 4to; 7, 'De Refractione, Optices Parte, Libri Novem,' Naples, 1693, 4to; 8, 'Pneumaticorum Libri Tres; cum Duobus Libris Curvilineorum Elementorum,' Naples, 1602, 4to, and in Italian, ibid., 1606, 4to.; 9, 'De Cælesti Physiognomiâ Libri Sex,' Naples, 1601, 4to, and frequently reprinted; 10, 'Ars Reminiscendi, Naples, 1802, 4to; 11, 'De Distillationibus Libri, Novem, quibus certâ Methodo, multiplicique Artificio penitioribus Naturæ Arcanis detectis, cujuslibet Misti in propria Elementa Resolutio perfectè docetur,' Rome, 1608, 4to, and Strasbourg. 1609, 4to; 12, 'De Munitione Libri Tres,' Naples, 1608, 4to; 13, 'De Aëris Transmutationibus Libri Quatuor,' Naples, 1609, 4to. 14, His dramatic works consist of fourteen comedies, two tragedies, and one tragi-comedy. The comedies were col-

lected into four volumes, 12mo, and published at Naples, 1726. All these works are analysed by H. Gab. Duchesne, at the end of his 'Notice Historique sur J. B. Porta,' Paris, 1801, 8vo.

PORTADOWN. [ARMAGH.]

PORTAFERRY. [DOWN.]

PORTARLINGTON. [QUEEN'S COUNTY.]

PORTCULLIS, in Fortification, is an assemblage of several large pieces of wood, joined across one another like a harrow, and each pointed with iron at the bottom. They are sometimes hung over the gateways of old fortified towns, ready to let down in case of a surprise, when the gates could not be shut.

PORTER. [BREWING.]

PORTER, SIR ROBERT KER, K.C.H., was born at Durham in 1780. He was the brother of Anna Maria Porter and Jane Porter. He very early showed an inclination for the arts, and was introduced to West, then president of the Royal Academy, who is said to have been so much struck with the spirit of the boy's sketches, that he procured his admission into the academy. In 1793 he had already evinced such extraordinary progress as to receive a commission to paint an altar-piece for Shoreditch church. He executed other similar works, but his battle-pieces were his most extraordinary productions. Of these the principal are the Storming of Seringapatam, the Siege of Acre, and the battles of Agincourt and Alexandria. In 1804 he went to Russia, and was appointed historical painter to the emperor. While he was in St. Petersburg he gained the affections of the Princess Mary, the daughter of the Prince Theodore de Sherbatoff, of Russia, and he married her in 1811. After his return to England, about 1806, he published 'Travelling Sketches in Russia and Sweden.' In 1808 he accompanied Sir John Moore's expedition to Portugal and Spain, and he attended the campaign throughout, up to the closing catastrophe of the battle of Corunna.

After his return from a second visit to Russia, he published, in 1813, 'An account of the Russian Campaign,' and he was knighted by the Prince Regent in the same year. He executed many sketches of the campaign in Portugal: 1817 to 1820 were occupied in his travels in Asia, of which he published a detailed account in 1821-22, 'Travels in Georgia, Persia, Armenia, Ancient Babylonia, &c., during the years 1817-18-19-20, with numerous engravings of Portraits, Costumes, Antiquities, &c.,' 2 vols. 4to.

In 1832 Sir Robert Ker Porter was created Knight Commander of the order of Hanover, by William IV. He had been appointed a few years before British Consul at Venezuela, and he resided at Caracas till 1841, when he paid his last visit to St. Petersburg. He died there, May 4, 1842.

PORTEUS, BEILBY, was born at York in 1731. At an earlier age than usual he was admitted a sizar of Christ's College, Cambridge, where he obtained a fellowship, and by the active exertions of his friends was made esquire-bedel of the University. In 1757 he was ordained deacon, and soon after priest. He held some small livings in Kent, and in 1767 became rector of Lambeth. After taking his degree of D.D. he was made chaplain to George III., in 1769. He was next (1776) promoted to the diocese of Chester, and eventually (1787) to that of London. In 1773—before either of these appointments—he had advocated some alterations in the Liturgy and Articles. He died May 14, 1808.

He first became known as a writer by obtaining Seaton's prize for the best English poem on a sacred subject. On this occasion the subject was 'Death,' and the production of Mr. Porteus was universally deemed one of great merit.

His works, consisting of sermons, lectures, and tracts, with a 'Life of Archbishop Secker,' and the poem already mentioned, were published in 1811, in 5 vols. 8vo.

PORTFIRE is a composition consisting of saltpetre, sulphur, and mealed gunpowder, in the proportions of 6, 2, and 1, respectively, mixed together, and rammed or driven into a paper case of a cylindrical or conical form, and less than an inch in diameter. Portfire is used for firing artillery or mines; and a piece sixteen inches long will burn from twelve to fifteen minutes.

PORTICI. [NAPLES, *Province.*]

PORTICO. Originally applied without distinction to colonnades and covered ambulatories, this term is now limited to signify a sheltered space inclosed by columns at the entrance to a building; and unless otherwise expressed, roofed with a pediment, like the end or front of a Grecian temple. The term therefore, as now restricted, answers to the *Pronáos* of such a temple. Porticos are described according to the number of columns in front, viz. tetrastyle, hexastyle, octastyle, &c. They are called prostyle when, as generally happens, they project from the main building. Such as are *in antis*, and recessed within the front of the building, are technically called *loggias*.

Pseudo-Prostyle is a useful term suggested by Mr. Hosking for such an arrangement of columns beneath a pediment as resembles a prostyle in elevation, but which, instead of advancing forwards, forms merely a slightly projecting break, the portico itself being within the building, and nowise differing from a recessed loggia, except that it is not *in antis*, and is crowned by a pediment. Of this kind is the Ionic portico of the East India House, London. Some porticos again may be termed compound prostyles, because, while they project from the building, they also recede within it, as is the case with those of the London Post-Office, University College, and Hanover Chapel, Regent Street. Besides these varieties, there are those which are semi-circular in plan, of which the transept entrances of St. Paul's Cathedral furnish very admirable examples.

Whatever be the form adopted for a portico, the character will be neutralised if the background or rear wall be filled with doors and windows. Such is the case with the otherwise noble and classical portico of St. George's, Bloomsbury. We should not so rigidly object to a series of other openings, whether arches or square-headed apertures between piers, provided they were confined to the centre, as for instance three open arches

corresponding with the three middle intercolumns of a hexástyle above them, or with the alternate ones of a more extended colonnade.

The temple-porticos of the ancients, or rather the external arrangement of columns in such edifices, are explained in the article CIVIL ARCHITECTURE.

PORTLAND, ISLE OF. [DORSETSHIRE.]

PORTLAND. [MAINE.]

PORTLAND VASE. This beautiful specimen of ancient art is one of the choicest treasures deposited in the British Museum. The time of its production is now unknown; but it is presumed to be the work of a Grecian artist. The first information we have respecting it is, that about the middle of the 16th century the vase was found inclosed in a marble sarcóphagus, within a sepulchral chamber, under the eminence called the Monte del Grano, about two miles and a half from Rome on the road to Frascáti. This sepulchral chamber appears to have been the tomb of the Emperor Alexander Sevérus and of his mother Julia Mammæa; and the vase was probably a cinerary urn belonging to the sepulchre. The elegance of form and the admirable workmanship of the vase procured for it a place in the palace of the Barberini family at Rome, where it remained more than two centuries; after which it became the property of Sir William Hamilton, from whom it passed to the Duchess of Portland. In 1810 it was deposited in the British Museum by the Duke of Portland. On Feb. 7, 1845, a young man, a visitor at the museum, wilfully broke the vase into several pieces by throwing a stone at it. The offender was secured, and punished by imprisonment. He seemed to be influenced by no other motive than a morbid desire for notoriety. The fragments of the vase were afterwards joined together, and the work restored far more successfully than might have been anticipated. It is now (1849) in one of the rooms of the museum open to the public.

This vase was said by Montfaucon to be formed of a precious stone; but subsequent examination has shown the material to be dark blue glass, relieved by figures and devices in white enamel. It is about ten inches in height.

PORTO. [OPORTO.]

PORTO-MAURIZIO. [NICE.]

PORTOBELLO. [EDINBURGHSHIRE.]

PORTPATRICK. [WIGTONSHIRE.]

PORTRAIT (*Portrait*, French; *Ritratto*, Italian; *Bildniss*, German; *Imago*, Latin; Εἰκών, Greek). A portrait, strictly speaking, signifies the likeness of anything whether animate or inanimate, either drawn or coloured upon a flat surface: in a more restricted sense it signifies a drawing or a painting representing the likeness of any human being; but it is also frequently applied to the pictures of animals.

The most famous portrait-painter among the ancients was Apelles: he enjoyed the exclusive privilege of painting the portraits of Alexander. One of his most celebrated pictures was a portrait of that monarch as Jupiter, called the 'Alexander Ceraunophoros,' for which, acccording to the incredible account of Pliny ('Hist. Nat.,' xxxv. 10, 36), he received twenty talents of gold (upwards of 50,000*l.* sterling).

In every portrait the countenance of the person represented should be the most important part of the picture; all accessories must be kept subordinate to the principal object. Fancy costumes are injurious to portraits as portraits, for a general resemblance being the principal object of portraiture, the subject should be clothed as usual, and the more simple the attire, the more prominent and consequently the more important will be the head, which is the principal object. It is by accurately giving the relative proportions of the features that what is called a striking likeness is produced, and this may be accomplished without entering into any minute detail of the parts.

The most successful painters of portrait in modern times have been Lionardo da Vinci, Raffaelle, Sebastian del Piombo, Giorgione, Bordone, Titian, Velasquez, Holbein, Hals, Rembrandt, Rubens, and Vandyck; and the following pictures are amongst the finest specimens of portrait painting extant:—his own portrait by Lionardo da Vinci, in the portrait gallery at Florence; Andrea Doria, by Sebastian del Piombo, in the Palazzo Doria at Rome; Titian and Aretino, by Titian, in the royal collection at Windsor; Pope Innocent X., by Velasquez, in the Palazzo Doria at Rome; the Meyer Family, by Holbein, in the gallery at Dresden; and the head of Gevartius, so called, by Vandyck, in the National Gallery in London.

Of the portrait painters of more recent times, Mengs, Reynolds, Gainsborough, David, Gerard, and Lawrence have had the greatest celebrity.

PORTSMOUTH, a sea-port town in Hampshire, parliamentary borough, municipal borough, and the principal station of the English navy, is situated in 50° 47′ N. lat., and 1° 7′ W. long. It is 76 miles S.W. from London, by the mail road, and 95 miles by the London, Brighton, and South Coast Railway. The South Western Railway has a branch, at the Bishopstoke junction, to Gosport, by which the distance is only 90 miles; and passengers are thence conveyed to Portsmouth in a few minutes by means of a floating steam-bridge.

The town of Portsmouth is situated on an island called the Island of Portsea, which may now be regarded as a peninsula, separated from the mainland by a very narrow channel, over which the roads and railway viaduct pass. The Island of Portsea is about 5 miles long N. to S., from 3 to 4 miles wide E. to W., and 16 miles in circumference. At the S.W. angle of the island is situated the town of Portsmouth, and N. of Portsmouth is the town of Portsea. On the west side of Portsea Island is Portsmouth Harbour, formed by an inlet from the British Channel. The entrance to the harbour is by a channel about a quarter of a mile wide, between Portsea and the town of Gosport on the opposite side of the channel. Portsmouth harbour is somewhat irregular in form, about 3 miles from S. to N., and from 2 to 3 miles from E. to W. On the east side of Portsea Island is Langston Harbour, about the same size as Portsmouth Harbour, and separated by Hayling Island from Chichester Harbour.

There are thus three large contiguous natural harbours, formed by inlets from the sea, and of which the last two are connected by a channel on the north side of Hayling Island. The greater depth of water renders Portsmouth Harbour by far the best of the three. The roadstead between the mouth of Portsmouth Harbour and the Isle of Wight forms an anchorage, part of which is well known under the name of Spithead. Adjacent to Spithead, on the coast of the Isle of Wight, near the eastern extremity of the island, is St. Helen's, a place of rendezvous for the navy; and near the coast of the Isle of Wight, between Cowes and Ryde, is the Motherbank, an anchorage for smaller vessels.

The excellence of Portsmouth Harbour attracted the notice of the Romans, who established a station at Porchester on its northern shore. Portsmouth was a place of importance in the time of Henry I., and there was a naval station there in the reign of John. The town is situated at the south-western extremity of Portsea Island, and just at the entrance of the harbour. It is inclosed by fortifications forming a semicircle to landward. The streets, with the exception of High Street, are narrow, and consist of houses of inferior appearance. North of Portsmouth is Portsea, extending along the harbour, and containing the dock-yard and the principal establishments connected with it. Portsea, like Portsmouth, is strongly fortified, and its defences are so united with those of Portsmouth, that the two towns may be considered as comprehended in the circuit of one fortress. At the southern extremity of Portsea is Southsea Castle, built by Henry VIII., and mounted with heavy cannon; opposite to which, on the Gosport side, is Fort Monkton. Between these two forts the passage into the harbour does not much exceed a furlong in width, and is commanded by the forts. The streets of Portsmouth and Portsea are well lighted and paved. Outside the fortifications of these two towns are extensive suburbs and several villages.

The dockyard is the largest in the kingdom, covering from 115 to 120 acres. It includes a rope-house, anchor wharfs, an anchor forge, a copper-sheathing foundry and mills; block, mast, sail and rigging, and other store-houses; a grand basin, in which vessels are received with all their standing and running rigging to be repaired; building-slips, docks for repairing—in a word, all that is requisite for the construction, equipment, armament, and repair of vessels. There are also residences for the port-admiral, the admiral superintendent, and other officers of the yard, a chapel, a school for naval architecture, and other buildings. The block-machinery, invented by the late Sir M. Isambert Brunel, is an admirable manifestation of mechanical skill; it is impelled by steam. Adjacent to the dock-yard is the spacious and well furnished gun wharf and its connected buildings. It is the grand depôt for cannon, shot, and every description of ordnance stores.

The parish church of St. Thomas, Portsmouth, is a spacious building, including some ancient portions, but mingled with additions of various later periods. The garrison chapel is on the Grand Parade; it is an ancient structure. Among the other churches are those of St. Mary, Portsea, an ancient building; the new church of St. Paul, Southsea, capable of accommodating 1900 persons, a quadrangular building, in the perpendicular style of Gothic architecture; the church of All Saints, Mile End, of similar architecture, with a handsome western front; a new Gothic church in Portsmouth; and another in Portsea.

Among the other public buildings are—the town-hall, with a covered market-place underneath, in High Street; the governor's house, on the Grand Parade; the residence of the lieutenant-governor; the theatre; the building of the Philosophical Society; and a national school house, with elegant concert, assembly, and card rooms above: all these are in Portsmouth. Haslar Hospital, for seamen and marines, is on the west side of the harbour, a little to the south of Gosport. The ramparts are planted with trees, and form an agreeable promenade. On the London road, about two miles from the town, is an extensive cemetery, laid out and planted with trees, and furnished with a chapel for the burial service, and an office for the officiating minister.

The trade of the place, which is considerable at all times, but especially in time of war, depends much upon the expenditure connected with or caused by the naval station and dockyard, and is of a very miscellaneous character. There is a considerable import of cattle from the Isle of Wight and from the west of England. Corn and provisions are brought in from Ireland, eggs from France, timber from the Baltic, and wine is imported direct from the Continent. Steam communication is kept up with the Isle of Wight, Southampton, Plymouth, and Hâvre. The number of vessels registered at the port on Dec. 31, 1847, was—under 50 tons, 161 (aggregate burthen 3959 tons); above 50 tons, 73 (aggregate burthen 10,549 tons). There were only four steam vessels.

The corporation of Portsmouth is said to have been established by Henry I., but the earliest known charter is of Richard I. Many subsequent charters were granted. The municipal borough includes the parishes of Portsmouth and Portsea, and is divided into seven wards, and governed by a mayor, 14 aldermen, and 42 councillors. The population of the municipal borough in 1841 was 53,032; of the parliamentary borough, which returns 2 members, 49,214. The population of the parish of Portsmouth was 9354; of the town, 8893. The population of the parish of Portsea was 43,678; of the town, 13,999. The population of the chapelry of Gosport was 8862.

PORTSMOUTH. [New Hampshire.]

PORTUGAL, THE KINGDOM OF, is the most westerly kingdom of Europe. It forms part of the Spanish peninsula, and is not divided from Spain by any well defined natural boundaries. All the great rivers of Portugal, the Minho, the Douro, the Tagus, and the Guadiana, have their sources in Spain, and belong to Portugal only in the lower part of their basins. The Mondego is the only considerable river which has its sources and its whole course within the limits of Portugal.

Portugal is bounded on the N. by the Spanish province of Galicia; on the E. by the Spanish provinces of Leon, Estremadura, and Andalusia; and on the S. and W. by the ocean. Its greatest length is about 350 miles from north to south, and its breadth varies from 90 to 125 miles. Its area is reckoned at about 37,900 square miles. It has a coast line of about 500 miles, of which about 400 miles face the west.

Surface, Climate, and Productions.—Portugal is intersected by several ridges, which are a continuation of the chains which cross Spain from east to west. In the north, the Serra de Marao is a continuation of the mountains of Astorga, which divide the waters of the Minho from those of the Douro. It enters Portugal north of Braganza, and covers the greatest part of the province of Tras os Montes and part of that of Entre Douro e Minho. South of the Douro is the Serra de Alcoba, which divides the basin of the Douro from that of the Mondego; and south of the Mondego is the Serra de Estrella, a continuation of the Sierra de Gata, which is the western part of the great central ridge of Castile that divides the waters of the Douro from those of the Tagus and the Mondego. The Serra do Junto, which is a continuation of the Estrella, runs nearly parallel to the coast, and terminates in the high promontory called Cabo da Roca, the most western point of the continent of Europe. The highest summits of the Serra de Estrella are between 6000 and 6500 feet above the sea. South of the Tagus, the Serra de San Pedro, a continuation of the Montanas de Toledo, enters Portugal near Portalegre, and divides the basin of the Tagus from that of the Guadiana. Farther south is the Serra de Monchique, which may be called a continuation of the Sierra Morena, being separated from it only by the course of the Guadiana. The great chains of the Portuguese mountains have a general inclination from north-east to south-west, and they throw off numerous offsets, which cover a great part of the country. Between these chains are the three basins of the Douro, Mondego, and Tagus. South of the Tagus is the plain of Alemtejo, the largest in Portugal, which is divided on the south-east by the mountains of Portalegre, Estremoz, and Evora, from the basin of the Guadiana, which, differing in this respect from the other great rivers of Portugal, has a general direction from north to south, and belongs, even in its lower course, partly to Portugal and partly to Spain. The province of Algarve, situated at the southern extremity of the kingdom, is separated from the rest by the Serra de Monchique, and forms a strip of land between the mountains and the sea, which has a general slope to the south, and is traversed by numerous torrents running from north to south.

The climate of Portugal presents considerable variations in the northern and the southern provinces. The southern provinces are very hot in summer and are subject to droughts; upon the whole however the climate may be said to be healthy, with the exception of a few spots south of the Tagus and near Setubal. The products of the country are—corn, Indian corn, rice, hemp, flax, honey, wax, plenty of fruits, especially excellent oranges and lemons, almonds, and abundance of good wine. The sea along the coasts and the rivers abound with fish, which is a great article of food with all classes. Sea-salt is collected in various places, particularly in the lagoon of Setubal. The sheep supply abundance of wool, of which some is equal to that of the Spanish merinos in fineness. Portugal has mines of copper, tin, and iron, of which only some of iron are worked. The manufactured articles are coarse woollen cloths in Alentejo and Beira; linens in Minho, Beira, and Tras os Montes; silks at Campo Grande, near Lisbon, and also at Oporto and Braganza; jewellery at Lisbon and Oporto. There are glass-works at Marinha Grande; paper manufactories at Alemquer, Lisbon, and Guimaraens; potteries at Lisbon, Oporto, Coimbra, Beja, Estremoz, and Caldes; cotton manufactories at Alcobaça and Thomar; and tanneries in various parts.

Population, Education, &c.—The population of Portugal in 1841 was 3,412,500. The Portuguese differ considerably from the natives of Castile and Leon, both in their manners and character, and the difference has forcibly struck most travellers who have crossed the eastern frontier of Portugal, which in several places is not marked by any geographical boundary. On the Portuguese side of the line the villages are wretched in the extreme; the inhabitants are filthy both in their houses and persons, and the peasants seem dejected, indolent, and spiritless. The Spanish villages on the other side are comparatively clean, and the Spanish peasants look manly, robust, and active. With regard to the educated classes, those of Portugal are generally polished in their manners and courteous to strangers. The fidalgos, or provincial nobility, are very numerous, though mostly poor.

Education in Portugal is lower than in Spain, and is very defective. The capital of the kingdom however is not wanting in literary and scientific institutions. [LISBON.]

The foreign trade is principally in the hands of English merchants. Most of the Portuguese wines and other produce are consumed in England. The quantity of wine exported to England in the year 1846 was 2,635,157 gallons; in the year 1847 the quantity was 2,883,896 gallons. Internal commerce suffers from the want of good roads. There are no canals, and the few rivers which are navigable are not so at all seasons. Manufactures are in a very backward state.

The whole Portuguese nation professes the Roman Catholic religion. At the head of the clergy is the patriarch of Lisbon, who has five suffragan bishops, besides four foreign bishops, and the archbishops of Braga in the north and Evora in the south, who have each four suffragan bishops. The convents of men were suppressed in May, 1834, by Dom Pedro, and their property has been annexed to the domain of the state. The monks were allowed a small pittance from the treasury.

Political Divisions and Government.—Portugal and the Algarve were divided for administrative purposes into six provinces, namely, ENTRE DOURO E MINHO, TRAS OS MONTES, BEIRA, ESTREMADURA, ALENTEJO, ALGARVE. Each province was divided into comarcas, and each comarca into parishes. A

description of each province is given under its proper head. The Cortes have since made a new territorial division of the kingdom into 12 provinces, which are subdivided into 26 comarcas, and these are again further divided into julgados.

During the middle ages feudalism was as prevalent in Portugal as in Spain, but the king was less restrained than in any other kingdom in the peninsula. The first instance of popular representation occurred in 1143, when the three estates met at Lamego, to confirm Alfonso I. in the title of king. A few attempts were subsequently made to retain some political power in the hands of the people; but the government at length settled down into a despotic monarchy, which it remained till 1823. From that date till 1849 many changes have been made in the constitution.

By the separation of Brazil, the Portuguese monarchy has been shorn of the brightest jewel of its crown. The remaining dependencies of Portugal are—1, the AZORES; 2, MADEIRA and Porto Santo; 3, Cape Verd Islands. [CAPE VERDS]; 4, the islands of Saint Thomas and Do Principe; 5, the captaincy or government of CONGO or ANGOLA; 6, the government of MOZAMBIQUE on the eastern coast of Africa; 7, the government of GOA in the East Indies; 8, that of MACAO on the coast of China; 9, some small settlements at TIMOR and other neighbouring islands.

History.—The early history of Portugal was involved in that of the larger part of the peninsula, and Portugal, under the Roman Empire, was included in the province of *Lusitania.* [SPAIN.] On the decline of the Roman power, when Spain was inundated by the Germanic tribes, Portugal shared in the general devastation; and when, at the beginning of the eighth century, the torrent of Arabian conquest spread over the Peninsula, the territories and towns of Portugal were as easily subdued as the remainder of Spain. [MOORS.] In the ninth century the greater part of northern Portugal was wrested from the Mohammedans, and became subject to local governors dependent on the counts of Galicia.

The first King of Portugal was Alfonso, who assumed the regal dignity in 1139, after a brilliant victory over the Moors. The sovereigns in that and the next following century were Sancho I. (1185-1211), Alfonso II. (1211-1223), Sancho II. (1223-1248), Alfonso III. (1248-1279), Dinis (1279-1325). These sovereigns were engaged in many wars with neighbouring nations, but Portugal gradually acquired importance under their rule.

The kings of Portugal in the next two centuries were—Alfonso IV. (1325-1357), Pedro I. (1357-1367), Fernando I. (1367-1383), Joam I. (1383-1433), Duarte (1433-1438), Alfonso V. (1438-1481), Joam II. (1481-1495), Manoel (1495-1521). The first three of these sovereigns were engaged in frequent wars against the kings of Castile. In 1383 the male line of the Burgundian princes became extinct in Portugal by the death of Fernando I.; and Dom Joam, an illegitimate son of Pedro I., became king. Joam was an able and a successful prince; and under his auspices the geographical expeditions of the Portuguese commenced. Alfonso II. and Joam II. were likewise distinguished men, who raised their country among the states of Europe, and promoted discoveries on the coasts of Africa, which were still further extended under Manoel, by the expedition of Vasco de Gama to India. [GAMA, VASCO DE.]

The kings of Portugal in the 16th and 17th centuries were—Joam III. (1521-1557), Sebastian (1557-1578), Enrique (1578-1580), Philip II., III., and IV., of Spain (1580-1640), Joam IV. (1640-1656), Alfonso VI. (1656-1683), Pedro III. (1683-1707). During the 16th century, the introduction of the Inquisition and the Jesuits into Portugal quenched the liberal spirit which had before prevailed to some extent; and the death of Enrique, by placing the Portuguese crown for sixty years in the hands of Spain, made Portugal a mere province of that country. The House of Braganza assumed the crown under Joam IV.

In the 18th and 19th centuries there have been—Joam V. (1707-1750), Jossé I. (1750-1777), Maria Francisca Isabel (1777-1810), Joam VI. (1810-1826), Pedro IV. (1826-1832), Doña Maria da Gloria (1832 to the present time). In the early part of the 18th century the commercial arrangements between Portugal and England commenced, by the treaty of Methuen.

The importance of Portugal among the states of Europe had long begun to decline, and although the administrative talents of the Marquis de Pombal, under Jossé I., gave a lustre to that reign, yet nothing could stop the downward tendency of the monarchy. During the career of Bonaparte, Portugal would have utterly fallen, but for the assistance of England. In 1820 a revolution commenced, which led to a struggle on the part of Dom Miguel to obtain the throne: this struggle he did not abandon till 1832.

Language and Literature.—The language of Portugal, like those of other kingdoms in the Peninsula, originated in a mixture of the Latin, Teutonic, and Arabic. The separation of Portugal from Spain, their wars, and the little commercial intercourse which existed between them during the middle ages, combined in course of time to make the Portuguese a different language. The Spanish, like the Portuguese, has many words borrowed from the Arabic. Their wars with the Moors of Africa and the Mohammedans of India in the 15th century introduced into it many others from the languages spoken in those countries. As a conversational language, the Portuguese is considered superior to the Spanish. It is more concise, easy, and simple, but not so rich. The pronunciation is difficult for a foreigner, more particularly the nasal sounds, in which it abounds. The gutturals however are neither so strong nor so common as in the Spanish.

The literature of Portugal is complete without being very rich. In all branches there have been happy attempts; in none is there an abundance, except in lyric and bucolic poetry, in both which branches the Portuguese are richer than their neighbours of the Peninsula. Poetry comprises the most important part of their literature; prose

and eloquence have been very little cultivated, owing to the intolerance of the government and the persecutions of the Inquisition. After the 15th century, poetry in Portugal became and remained bombastic and affected, and its ancient power and natural grace were completely lost. In the time of Louis XIV. the French were copied, and many Gallicisms were admitted. Under Pombal, Portuguese literature revived, and poets strove to give elevation to the language. Prose too became more simple and pure by the imitation of the classics. That minister was the first who banished the scholastic logic and metaphysics from the lecture-rooms of Coimbra. The study of the ancient languages was always and still continues to be neglected.

Among the most distinguished poets of Portugal, given in chronological order, are—Gonzalo Hermiguez, Egaz Moñiz, King Dinis, the authors of the 'Cancioneiros Geraes,' Bernardim Ribeyro, Christovão Falcão, Jorge de Montemayor, Saa de Miranda, Antonio Ferreyra, Jeronymo Cortereal, Diego Bernaldez, Pedro de Andrade Caminha, and above all others, Luys de Camoens, whose poem 'Os Lusiadas,' has been translated into every language of Europe.

At no period did historical composition in Portugal attain the elevation which it reached in Spain. The ancient chronicles are fewer, and not so well written; there is little or no local history, and as to a general narrative embracing all the events and political transactions of that kingdom, the Portuguese possess none but the incomplete work of Brito. As might be expected, the events of India formed the favourite theme of many of the Portuguese historians of the 16th century.

With the 16th century the brilliant period of Portuguese literature passed away, and the connection with Spain, and the influence produced at the beginning of the 17th century by the fantastic school of the Gongoristas [GONGORA], almost entirely naturalised Spanish literature in Portugal.

PORTUGAL LAUREL. [CERASUS.]

PORTULA'CEÆ, a small natural order of polypetalous Exogens. They are annual, perennial, half-shrubby or shrubby plants, with flowers which are often very showy, although more frequently inconspicuous. Their prevailing colour is purple or scarlet. They occur in all the hotter or milder parts of the world, especially in dry exposed situations, for which their succulent leaves render them well suited; the Cape of Good Hope is their favourite station.

Common Purslane, *Portulaca oleracea*, a potherb, now disused, indicates the harmless quality of such plants. The *Talinums* and *Calandrinias* and a few species of *Portulaca* are well known as gay garden-flowers.

PORTUMNUS, Dr. Leach's name for a genus of Brachyurous Crustaceans, of which, as an example, may be adduced, *Portumnus variegatus*, found in the Adriatic Sea, the Mediterranean, &c.

PORTU'NIDÆ, or Paddling Crabs, a family of Brachyurous Crustaceans, nearly allied to the *Cancerians*.

The general form of the *Portunians*, says M. Milne Edwards, does not ordinarily differ much from that of the greater part of the *Cancerians*, but the carapace is always but little elevated, and sometimes has a lozenge shape. The orbits are directed upwards and forwards. The internal antennæ are bent back transversely, or at least very obliquely outwards, and the basilary joint of the external antennæ is partially lodged in a gap of the internal orbitary angle. The third joint of the external jaw-feet is always wider than it is long, and sharply truncated or notched at its anterior and external angle, for the insertion of the fourth joint.

The sternal plastron is always very wide, and in general the last thoracic segment is much more developed than all the others, even than that which carries the anterior feet; the suture which separates this segment from the preceding is directed very obliquely forwards and inwards; the vault of the sides is generally nearly horizontal, and the posterior sella Turcica very narrow. The anterior feet are in general very elongated, the succeeding feet are sometimes natatory, and the posterior feet always so, their tarsus being lamellar: the second pair of feet are ordinarily more than once and a half as long as the carapace.

The crustaceans of this group are for the most part essentially swimmers, and live often out at sea. They are vulgarly called Paddlers. The following genera are arranged under the tribe by M. Milne Edwards:—*Carcinus* (Leach), *Platyonychus* (Latreille), *Polybius* (Leach), *Portunus* (Fabricius), *Lupea* (Leach), *Thalamita* (Latr.), and *Podophthamus* (Lamarck).

PORTUS, FRANCIS, born in 1511, in the island of Crete, lost both his parents at an early age, and was sent by a friend to Padua, where he studied classical literature and philosophy. In 1536 he was made professor of Greek literature at Modena, a situation which he held ten years. He ultimately obtained a professorship at Geneva in 1562, and became a citizen. He died at Geneva in 1581. Portus wrote commentaries on many Greek authors, such as Aristotle, Pindar, and others. He translated the Psalms into Latin.

PORTUS, ÆMILIUS, the son of Francis Portus, was born about 1550, and was instructed by his father in the ancient languages. After the death of his father he left Geneva, and in the same year (1581) he was made professor of Greek at Lausanne. In 1592 he was invited to the chair of Greek literature in the university of Heidelberg. He died at Heidelberg in 1610.

The numerous works of Æmilius Portus consist of commentaries, translations, and original works. Among the first we may mention his Commentary on Pindar (1598), his edition of Euripides, with notes of Canter, Brodæus, Stibilinus, and some of his own, Geneva, 1602; Aristophanes, Geneva, 1607; Aristotle's Rhetoric (the translation was made by Æmilius, the Commentary by his father), Spire, 1598; Homer's Iliad, Xenophon, and Thucydides. He translated into Latin the Lexicon of Suidas, Thucydides, and some other Greek authors. Among his original works are an Ionic Lexicon, and a Pindaric Lexicon.

PORUS (Πῶρος), the name given by Greek

writers to several Indian kings. From its frequent occurrence, it appears to have been the name of a family or tribe, rather than the proper name of an individual.

Alexander, in his invasion of India, met with two different kings of this name, one of whom ruled over the country between the Hydaspes and Acésines, and the other over the country between the Acésines and Hydraotes (Ravee). The former made a formidable resistance to Alexander.

POSEIDON. [NEPTUNUS.]

POSEN (*Poznanie*), a province of Prussia with the title of Grand Duchy, and formerly belonging to Poland, lies between 51° 10′ and 53° 32′ N. lat., 15° 7′ and 18° 38′ E. long. It is bounded N. by the province of Prussia, E. by Poland, S. by Silesia, and W. by Brandenburg. The area is 11,352 square miles; the population in 1847 was 1,364,399, of whom 866,390 were Catholics, 416,648 Evangelicals, and 81,299 Jews. The surface is perfectly level, except along the banks of the Wartha, and on the frontiers of Silesia. The soil is partly reclaimed marsh, which is very fertile, and partly sand, so mixed with loam that the soil may be considered as tolerably good. The most fertile parts are the country on both sides of the Wartha, and the Netzbruch, a low tract on the river Netze, about 90 miles in length, and not above 3 in breadth, which, having been completely secured by dykes, is converted into fine corn and meadow land. The river Wartha, which traverses the province in its whole breadth, and its tributary the Netze, are navigable. The Netze is connected by the Bromberg canal with the Brahe, which is navigable from Bromberg to its entrance into the Vistula, on the eastern frontier. The province is traversed by the railroad, which leads from Posen to Stettin, and by another line now in course of construction, which passes from Berlin to Bromberg, whence it is to be continued to Königsberg. It is proposed also to make a railway from Posen to Breslau through Lissa, with a branch from this last-named town to Glogau.

There are several lakes, the largest of which is the Goplo lake, which gives rise to the Netze. The air is pure and healthy. The chief productions are corn of all kinds, pulse, culinary vegetables, flax, hemp, tobacco, hops, fruit, and timber. There are limestone, freestone, saltpetre, and bog-iron. Agricultural operations are carried on in a very careless manner. The exports consist chiefly of wheat, wool, timber, cattle, tallow, hides, wax, honey, hogs' bristles, and feathers. Manufactures were first introduced by German settlers, who fled from Silesia in consequence of religious persecution, and founded several towns on the frontier.

During the late revolutionary troubles in Prussia, this province was violently agitated; and the Poles were in open insurrection against Prussia in the months of April and May of 1848. On the 3rd of April of that year, the districts of Netze, the circles of Birnbaum, Meseritz, Bomst, Fraustadt, and others chiefly inhabited by Germans to the number of about 593,000, demanded incorporation with the territory of the German confederation; the question was referred by Prussia to the German Diet, which admitted the districts to form a part of Germany, and their admission was recognised and confirmed by a decree of the German National Assembly, sitting at Frankfort, on the 27th of July of the same year. The Prussian ministry have now (Dec. 1849) decided to incorporate the whole of the Grand Duchy with the territory of Germany.

The government of Posen occupies the southern part of the province, and has an area of 6,807 square miles, with a population of 900,430. *Posen* (in Polish *Poznan*), the capital of the province and of the government, situated in 52° 24′ N. lat., 16° 52′ E. long., in a sandy tract on the left bank of the Wartha, is a strongly-fortified town with a population of 40,209. The town, which has three suburbs and four gates, is pretty regularly built. The chief public buildings are—the castle, situated on an eminence; 24 Roman Catholic churches, the most remarkable of which are the cathedral and the church of St. Stanislaus, the latter being a masterpiece of Italian architecture; two Protestant churches, a Greek chapel, a synagogue, the archi-episcopal palace, the theatre, the chief guard-house, the town-hall, &c. Posen is the residence of the Catholic archbishop of Posen and Gnesen, and of the governor of the province. The manufactures consist of chintzes, calico, tobacco, leather, woollen cloth, ticking, sealing-wax, and carriages. There are likewise breweries, distilleries, several printing-offices and lithographic presses. The city has some trade, and three annual fairs. It is 160 miles E. from Berlin. *Lissa*, 38 miles S. from Posen, has 9000 inhabitants. This town has a palace, a handsome market-place, a gymnasium, five churches, a synagogue, and extensive manufactories of woollen cloth, linen, snuff, chicory, and carriages. *Rawitsch*, situated in a marshy spot near the frontiers of Silesia, has 8500 inhabitants. It is pretty well built, has a gymnasium, a town-hall, and manufactures of woollen cloth, linen, leather, tobacco, and earthenware. *Meseritz*, situated in a beautiful and fertile country on the river Obra, 56 miles W. of Posen, has 4500 inhabitants. The manufacture of woollen cloth is very considerable. *Krotoszin*, close to the Silesian frontier, has 7000 inhabitants, who manufacture woollen cloths, linen, tobacco, and chicory. There are also tanneries, dye-houses, and distilleries. *Fraustadt*, in Polish *Wschowa*, situated on the frontiers of Silesia, consists of the old and new town; it has four churches, a gymnasium, an orphan asylum, and 6257 inhabitants, who manufacture woollen and linen cloths, beer and spirits, and carry on a considerable trade in corn, cattle, wool, &c. *Kempen*, also on the Silesian frontier, has 6154 inhabitants, who carry on a considerable trade in horses with Silesia, and manufacture cloth, linen, tobacco, and soap.

The north of the province forms the government of Bromberg, which has an area of 4545 square miles, and a population of 463,969. The chief town *Bromberg*, in Polish *Bydgoszcz*, is situated on a hill above the Brahe, about 5 miles W. from the Vistula, 67 miles N.N.E. from Posen, and has about 8000 inhabitants. The canal which com-

pletes the navigation between the Oder and the Vistula enters the Brahe at this place. The town is well built; it has a gymnasium, a training school, manufactures of chicory, tobacco, linen and woollen cloth, sugar, &c.; and a brisk trade in corn, cattle, &c. *Gnesen*, an old town, with 6000 inhabitants, 44 miles S.S.W. from Bromberg; it formerly gave title to a Catholic archbishop, who was primate of Poland. Besides the cathedral, there are 7 Roman Catholic churches, and a seminary for the clergy. The inhabitants manufacture woollen cloth and linen, and there are breweries and distilleries. *Inowratzlaw*, also called *Jung-Breslau*, an ill-built town, in a fertile plain, 24 miles S. by E. from Bromberg, has 5100 inhabitants, who have distilleries, breweries, and saltpetre works. There are 5 Roman Catholic churches, a Franciscan convent, and a synagogue. *Schönlanke*, is a well-built town, 62 miles W. from Bromberg, with 4000 inhabitants, who manufacture woollen cloths.

POSIDONIA. [PÆSTUM.]

POSIDO'NIUS, a stoic and a Greek philosopher, was a native of Apameia in Syria, but a citizen of Rhodes, where he resided the greater part of his life. The dates of his birth and death are unknown. He was a disciple of Panætius. He is said to have settled in Rome B.C. 51, and to have lived to the age of eighty-four. Posidonius was an instructor of Cicero, who speaks of him in the highest terms. Besides his philosophical works, he wrote on geography, history, and astronomy; but nothing remains of his labours except a few sentences quoted by Cicero and other writers.

POSSE COMITATUS (literally the power of a county) comprises all able-bodied males within the county between the ages of 15 and 70 years. All such persons are bound to aid the sheriff in all matters that relate to his office; and he is fineable if he neglect to avail himself of their aid. In case of any invasion, rebellion, riot, &c., or breach of the peace within the county, all such persons, on pain of fine or imprisonment, are bound to attend him on being charged by him to do so, and to assist in opposing and suppressing the rioters, &c. The Posse Comitatus may come armed, and are justified in killing a person in case of resistance. They may also be raised when necessary for the purpose of apprehending traitors, felons, &c., and that even within particular franchises. It is lawful for any peace-officer, and perhaps even for a private person, to raise a competent number of people for the purpose of opposing and suppressing enemies, rebels, rioters, &c., within the county. But all such persons are punishable if they use unnecessary violence or create false alarms. It is also the duty of the sheriff, or any minister of the king who has the execution of the king's writs, or process even of a civil nature, who meets with actual resistance in his attempt to execute them, to raise a power sufficient to quell the resistance. (2 Inst., 193, 194; 3 Inst., 161; 1 Hawk., P. C., 152, 156.)

POST OBIT BOND (*Post Obitum*, Lat.), a bond given for the purpose of securing a sum of money, the condition of which is, that the money shall be paid on the death of some person.

POST-OFFICE. Correspondence is the offspring of advanced civilisation. When the state of society in this country anterior to the 17th century is considered, there can be little surprise that we hear nothing of a post-office before that period. The business of the state only demanded correspondence. The king summoned his barons from all quarters of the kingdom by letters or writs, and held frequent communication with his sheriffs, to collect his parliament together, to muster his forces, to preserve the peace, to fill his treasury. The expenses of the establishment of Nuncii, charged with the conveyance of letters, formed a large item in the charges of the royal household. As early as the reign of King John, the payments of Nuncii for the carriage of letters may be found enrolled on the Close and Misæ Rolls, and these payments may be traced in an almost unbroken series through the records of subsequent reigns. Nuncii also formed part of the establishment of the more powerful nobles. In 1481 Edward IV., during the Scottish war, is stated by Gale to have established at certain posts, twenty miles apart, a change of riders, who handed letters to one another, and by this means expedited them two hundred miles in two days. The Persians had a similar means of communication, which is described by Heródotus (viii. 98). It would seem that in England the posts, at which relays of riders and horses were kept, were wholly private enterprises; but that when their importance became felt and appreciated, the state found it both politic and a source of profit to subject them to its surveillance. A statute in 1548 (2 & 3 Edw. VI. c. 3) fixed a penny a mile as the rate to be chargeable for the hire of post-horses.

In 1581 one Thomas Randolph is mentioned by Camden as the chief post-master of England; and there are reasons for concluding that his duties were to superintend the posts, and had no immediate connection with letters. The earliest recital of the duties and privileges of a postmaster seems to have been made by James I. The letters patent of Charles I. in 1632 ('Pat.,' 8 Car. I., p. i. m, 15 d; 'Fœdera,' vol. xix., p. 385) recite that James constituted an office called the office of postmaster of England for foreign parts being out of his dominions.

In 1635 a proclamation was made 'for settling of the letter-office of England and Scotland.' It sets forth 'that there hath been no certain or constant intercourse between the kingdoms of England and Scotland;' and commands 'Thomas Witherings, Esq., his Majesty's postmaster of England for foreign parts, to settle a running post or two, to run night and day between Edinburgh and Scotland and the City of London, to go thither and come back in six days.' Directions are given for the management of the correspondence between post-towns on the line of road and other towns which are named, and likewise in Ireland. An attempt of the Common Council of London to set up a separate post-office in 1649 was checked by a resolution of the House of Commons, which declared that the office of postmaster is, and ought to be, in the sole power and disposal of parliament.

But the most complete step in the establishment of a Post-office was taken in 1656, when an act was passed 'to settle the postage of England, Scotland, and Ireland.' It enacts that 'there shall be one General Post-Office, and one officer stiled the Postmaster-General of England and Comptroller of the Post-Office.' This officer was to have the horsing of all 'through' posts and persons 'riding in post.' Prices for letters, both English, Scotch, Irish, and foreign, and for post-horses, were fixed. All other persons were forbidden to 'set up or imploy any foot-posts, horse-posts, or pacquet-boats.' In 1683 a metropolitan penny-post was set up, the history of which is given at length in the 'Ninth Report of the Commissioners of Post-Office Inquiry.' From 1711 to 1839, nearly 160 acts affecting the regulations of the Post-Office were passed. In that year Mr. Rowland Hill's measures for Post-Office Reform were embodied in an act (2 & 3 Vict. c. 52), of which the regulations are now in operation, which conferred temporary powers on the lords of the treasury to do so, and was subsequently confirmed by an Act 3 & 4 Vict., c. 96, passed Aug. 10, 1840.

Revenue.—Of the early period of the Post-office establishment, and before 1716, only a few scattered accounts can be collected. In 1653 the annual revenue was farmed for 10,000*l.*, and in 1659 for 14,000*l.* ('Journals of the Commons'.) In 1663 it was farmed for 21,500*l.* annually, and the amount settled on the Duke of York. In 1674 the farming of the revenue yielded 43,000*l.* In 1685 it produced 65,000*l.* Parliament resumed the grant after 1688, though the king continued to receive the revenue. It continued to increase, though, considering the immense progress that was made in commerce and population, not rapidly. In the year before the alteration (1838) the revenue for the United Kingdom was,

Gross Receipts . . .	£2,467,216
Charges of collection . .	669,756
Returns	120,938
Net receipts . . .	1,676,522
Rate per cent of collection .	27

On Dec. 5, 1839, as a preparatory measure, the inland rates were reduced to a uniform charge of 4*d.* per half-ounce. The scale of weight for letters advanced at a single rate for each half-ounce up to sixteen ounces. Other reductions were made in packet-rates; and the London district post was reduced from 2*d.* and 3*d.* to 1*d.* This measure continued in force until Jan. 10, 1840, when a uniform inland rate of postage of 1*d.* per half-ounce, or 2*d.* per ounce, all fractions of an ounce beyond the first being reckoned as an ounce, payable in advance, or double postage payable on delivery, came into operation. On this day parliamentary franking entirely ceased. On May 6 stamps were introduced. The warrants of the lords of the treasury which authorised these changes were published in the 'London Gazette' of November 22 and December 28, 1839, and April 25, 1840. Returns have been made which show the increase of letters under the uniform-postage system. The number of letters which were actually counted for the week ending November 24, 1839, before any changes took place, was 1,585,973 letters, including franks; for the week ending December 22, 1839, during the fourpenny rate it was 2,008,687; and for the week ending Feb. 21, 1849, it was 6,849,196. Thus the number of chargeable letters of all kinds increased 29 per cent. under the 4*d.* rate, and has been more than quadrupled under the 1*d.* rate. The revenue also has nearly reached its amount before the alteration. For the year 1848 the revenue was—

Gross receipts .	£2,192,478
Cost of management	1,386,853
Net revenue . .	740,429

The head of the Post-Office is styled the Postmaster-General, under whose authority are placed all the post-offices in the United Kingdom and the colonies. The office was jointly held by two persons until the last few years. It is considered a political one, and the holder relinquishes it with a change of ministry; but the Postmaster-general has not generally a seat in the cabinet. Constant additions are being made to the number of post-offices throughout the kingdom. Every post-office in the United Kingdom has direct communication respectively with the chief offices in London, Dublin, and Edinburgh.

The management of the conveyance of the mails by sea and land is subject, of course, to those constant changes which arise out of the improvements daily taking place in the various modes of transit. Certain packets are exclusively controlled by the Admiralty, to whose charge they were removed in 1837; others still remain with the Post-Office. Contracts for the conveyance of the mail-bags to the Continent are made between the Post-Office and the proprietors of certain steam-vessels. The Post-Office, moreover, has the power of sending a bag of letters in any private ship.

The number of miles travelled over in England and Scotland by the mail-coaches in 1834 was 5,911,006, and in 1839, 7,377,857. The average speed in England was 8¼ miles per hour; greatest speed 10½ miles; slowest 6 miles. No mail-coach now (1849) leaves London. All letters and newspapers are sent by rail, on all the principal lines twice a day, and to several of the large towns oftener. Newspapers are sent free of postage, and single books, with their ends left open, may be forwarded by post at a rate of 4*d.* per lb.

The principle of cheap postage has been applied to the transmission of money through the post-office by means of money-orders. A few years ago the cost of sending 10*s.* to a person 160 miles from London would have been 2*s.* 2*d.*, whereas the expense would now be only 4*d.*, including the postage. In November, 1840, the commission on money-orders was reduced from 1*s.* 6*d.* to 6*d.* for sums above 2*l.* and not exceeding 5*l.*; and from 6*d.* to 3*d.* for sums not exceeding 2*l.* The number of offices empowered to grant money-orders has been increased and other facilities have been granted. The consequences of these successive changes have been as follows:—

Number and amount of Money-Orders issued in England and Wales in the quarters ending—

	No.	Amount.
5 April, 1839 ...	28,838	£49,496
5 Jan., 1840 ...	40,763	67,411
5 Jan., 1841 ...	189,984	334,652
5 Jan., 1849 ...	4,203,727	8,151,295

POSTLETHWAYT, MALACHI, is supposed to have been born about 1707; but no particulars relative to his origin or education, and very few relative to his after-life, appear to exist. In the introductory discourse to his work, entitled 'Great Britain's True System,' published in 1757, he complained of not receiving justice from the public, who treated him as an 'idle schemist or projector.' He died Sept. 13, 1767.

Among his other works are:—1, 'Considerations on the Revival of the Royal British Assiento between His Catholic Majesty and the Hon. the South Sea Company,' 8vo., Lond., 1749; 2, 'The Merchants' Public Counting-house,' 4to., Lond., 1750; 3, 'The Universal Dictionary of Trade and Commerce, translated from the French of Savory, with additions,' &c. 2 vols. fol., Lond., 1751–56, last edition 1774; 4, 'Britain's Commercial Interest explained and improved,' 3 vols. 8vo., Lond., 1757; and several others on similar subjects.

POSTULATE (*postulatum*, *αἴτημα*), a thing required to be granted, or the use of which in reasoning is *demanded*.

The distinction between a postulate and an axiom lies in this—that the latter is admitted to be self-evident; while the former may be agreed upon between two reasoners and admitted by both, but not as a proposition which it would be impossible to deny.

The word axiom is derived from the Greek *ἀξίωμα*, which is formed from the verb *ἀξιόω*, *to think worthy of;* and thence to *desire* or *demand*. It was not used in the time of Euclid, by whom the principles which we call axioms are termed *κοιναὶ ἔννοιαι*, or *common notions*. The word was not in universal use as late as the year 1600, at which date we find 'communis sententia' preferred to 'axioma.'

The term axiom was originally peculiar to geometry, in which science it means a proposition which it is necessary to take for granted. It is usual to define an axiom as a *self-evident proposition;* but this, though a true description of all the axioms which are found necessary, is not a good definition.

A self-evident proposition, as such, ought not to be made an axiom, and it is not admitted as such in geometry, however evident it may be, provided it can be proved from those propositions which are called axioms.

The necessity that there should be some axioms is evident from the process of reasoning. The deduction of propositions from the comparison of other propositions must have a beginning somewhere, so that there must be at least two propositions to begin with, the evidence of which is derived from other sources than reasoning.

POSTUMUS, a native of Gaul, distinguished himself in the Roman service, and was appointed by Valerianus governor of the Gauls. Under the reign of Gallienus he was saluted emperor by the troops in that part of the empire. Postumus ruled Gaul for ten years with great ability and moderation, says Eutropius; but he was killed in a mutiny of the soldiers headed by one Lollianus, because he would not allow them to plunder Moguntiacum (Mainz), which had revolted against him.

POTAMO'GETON, a genus of plants belonging to the Endogenous class, and the natural order *Potameæ*. The species are water-plants. *P. natans* and *P. crispus* are natives of Great Britain. *P. densus* is found in ditches and ponds of water in England. There are twenty British species of Potamogeton.

POTASH. [POTASSIUM.]

POTA'SSIUM, a metal, the base of the alkali Potash, in which it exists combined with oxygen. It was discovered by Sir H. Davy in the year 1807. Its properties are the following:—In colour and lustre it strongly resembles mercury; it is solid at the usual temperature of the air: at 50° it is soft and malleable, and yields like wax to moderate pressure, and at 32° it becomes brittle; at 70° it is somewhat fluid, but not perfectly so till the temperature reaches 150°; if heated to low redness, out of the contact of the air, it sublimes, and condenses on cooling, unchanged. Its texture when brittle is crystalline. Its specific gravity at 60° is 0.865; it is opaque, and a good conductor of heat and electricity.

The most remarkable chemical property of potassium is its great affinity for oxygen, which at common temperatures exceeds that of any other body for this elementary substance. It tarnishes rapidly and visibly by mere exposure to the air, and the more rapidly as the air contains moisture, which it decomposes, and by combining with its oxygen becomes oxide of potassium, or potash.

On account indeed of its powerful affinity for oxygen, it must be kept either in small glass tubes hermetically sealed, or in a fluid, such as naphtha, which contains no oxygen; when heated in the air it takes fire, burns with a purple flame, the evolution of much heat, and is converted either into potash or peroxide of potash, or a mixture of them. It takes the oxygen from any mixture of gases containing it, and indeed from almost every substance with which that element happens to be combined; so that when thrown upon water it decomposes it, burning vividly.

Oxygen and *Potassium* form two compounds, protoxide and peroxide of potassium. The *protoxide* (P^1 O^1), the well-known substance *Potash*, is white, solid, extremely caustic, and readily attracts moisture and carbonic acid from the air; it fuses when heated, but bears a high temperature without being volatilised or decomposed. The *hydrate of potash* is formed whenever an aqueous solution of potash is evaporated to dryness; it is white, hard, and brittle, extremely caustic, very deliquescent, and very soluble both in water and in alcohol. By evaporating the aqueous solution, crystals are obtained containing much water. The *peroxide* (P^1 O^3) is an unimportant compound. *Hydrogen* and *Potassium* form two compounds, which are very little known.

The *Chloride* of *Potassium* (P^1 Chl^1), consists of cubic crystals, colourless, inodorous, saline, and rather bitter to the taste. The *Fluoride* (P^1 F^1) has the form of cubic crystals; they are colourless, deliquescent, have a sharp saline taste, and dissolve readily in water. The *Bromide* (P^1 B^1) appear in cubic crystals, which are colourless and inodorous, have a very penetrating taste, are very soluble in water, and most so when it is hot. By heat this salt suffers igneous fusion, but is not decomposed. *Sulphur* forms five compounds with potassium; the chief of these is the *proto-sulphuret* (P^1 S^1), which has a red colour, a disagreeable alkaline and sulphurous taste, deliquesces on exposure to the air, and is soluble both in water and in alcohol. The *Iodide* (P^1 I^1) has a penetrating taste; it is very soluble in water, but absolute alcohol dissolves it sparingly; at a red heat it fuses, and at a very high temperature it is volatilised without suffering decomposition. The *Cyanide* (P^1Cy^1) is a pungent alkaline precipitate; when combined with iron, it produces the *Ferrocyanide of Potassium*, sometimes called *Prussiate of Potash*, or the *triple Prussiate of Potash*. This salt is inodorous; its taste is rather saline. When a solution of a per-salt of iron is added to it Prussian Blue is produced.

Potash Salts.—Potash has powerful affinity for most acids; the salts which they form are never prepared, as many metallic salts are, from the direct action of the acid and the metal, and but seldom indeed from the immediate combination of the alkaline oxide, or potash, with acids. Some of the most important salts are found native, and others are very commonly the result of chemical operations performed with the intention of preparing other products at the same time.

Nitrate of Potash, Nitre, or Saltpetre, is colourless, inodorous, has a cooling sharp saline taste, and is readily soluble both in cold and in hot water. At about 616° of Fahr. nitre fuses, and at a high temperature it suffers decomposition. Nitre possesses powerful antiseptic properties. It is largely employed in the manufacture of gunpowder and of nitric acid, and also in numerous processes in the chemical arts and manufactures. *Chlorate of Potash* is colourless, inodorous, and has a cooling austere taste. When triturated with certain inflammable bodies, as sulphur and phosphorus, combustion or explosion, or both, are produced. This salt is employed in chemical investigations on account of the purity of the oxygen gas which it yields; it is also employed in the manufacture of matches which are fired by means of friction. *Carbonate of Potash* is known in its impure state by the name of *Pearl Ash*. When pure, it is colourless and inodorous, its taste is strong and disagreeable, it does not readily crystallise, and is never kept in crystals: it is largely employed in the arts, and also in medicine.

Bicarbonate of Potash is inodorous, colourless, and crystalline; has scarcely any alkaline taste, and is largely employed in medicine and in chemical investigations. *Sulphate of Potash* is colourless, inodorous, bitter, and rather hard; it is employed to a small extent in medicine and manufactures. *Bisulphate of Potash* is colourless and inodorous, but extremely sour and bitter; it is very soluble in water; the solution reddens vegetable blues very strongly, and decomposes carbonates with effervescence. *Bitartrate of Potash, Cream of Tartar*, or *Tartar*, is colourless, rather hard, inodorous, and has a sour taste. It is very largely employed in the preparation of tartaric acid, in medicine, and some chemical arts. When an equivalent of potash is added to this salt, it becomes *neutral tartrate of potash*: this salt is used in medicine, and being much more soluble in water than the bitartrate, was formerly called Soluble Tartar. *Oxalic Acid* forms three different compounds with potash, the *oxalate, quadroxalate*, and *binoxalate*; this last is a natural product obtained from sorrel, and is commonly known by the name of salt of sorrel. It is a colourless crystalline salt, and has a sour bitterish taste.

Medicinal Properties of Potassium.—The preparations of potash which are used in medicine are very numerous; they may be reduced to the following heads:—First, those which are employed from their causticity to produce counter-irritation, or to open abscesses; these are hydrate of potash (potassa fusa) and potash with lime (potassa cum calce). Second, those which are employed to counteract acidity, viz. liquor potassæ, carbonate of potash, and bicarbonate of potash, the causticity of which last two is diminished in proportion to the increase of the carbonic acid combined with the alkali. Thirdly, those which possess a purgative property, such as the sulphate and bisulphate of potash, the tartrate and bitartrate. Fourthly, those possessed of a diuretic property, such as the acetate of potash, and, when in small doses, the nitrate and chlorate. Besides these, there are the sulphuret of potash, the bromide of potassium, and iodide of potassium, which possess special and characteristic qualities, which prevent their being classed with any of the preceding.

POTATO (*Solanum tuberosum*, Linnæus). The potato was first brought to this country from Virginia by Sir Walter Raleigh, and was first planted in his garden at Youghal, in Ireland. But the potato had been known in Spain and Portugal at an earlier period, and it is from them that we most directly derive the name by which we know it. The inhabitants of Quito called it by some name which the Spaniards corrupted into battata, to which potato is a close approximation.

The potato was limited to the garden for at least a century and a half after it was first planted at Youghal, and it was not until 1732 cultivated as a field crop in Scotland.

Though the plant may be propagated both by its seed and tubers, practical management has confined the cultivation to the latter mode, except for the purpose of raising new varieties. In order to obtain seed, properly so called, the potato-apple when perfectly ripe should be dried, and then disengaged from its seed by rubbing with the hand. The seed should be preserved in a dry place, in paper or cloth bags, until the middle of March or beginning of April, when it may be sown in wooden boxes or earthen pans, with a covering of less than half an inch of well pulverised earth. The vessels ought then to be placed in hotbeds of mild heat,

such as is suited to the raising of half-hardy annuals. The plants, when an inch high, should be pricked out into other vessels, and placed in a temperature somewhat lower than before, to inure them to the external air, to which they should be exposed after frosts have ceased. These plants should be put out in drills sixteen inches apart, and with an interval of six inches between the plants in the rows. They will produce tubers in the first year, and these may be planted in the following season in the ordinary way.

To market-gardeners it is a great object to raise the earliest potatoes, considering the high price which they obtain for them, though in their waxy state they are neither wholesome nor palatable.

The best soil for potatoes generally is that which is altogether fresh from the state of ley, or which has not long been broken up: land which has been in grass for only two or three years is easily prepared for the principal crop. It should be as deeply ploughed as possible before winter, and early in March harrowed and thoroughly cross-ploughed. After lying in this state for two or three weeks, it should again be well harrowed and very deeply ploughed twice, without bringing up any bad substratum, and it will then be fit for the reception of the crop.

The most approved mode of setting potatoes is in drills, and putting manure over them in the drill; but sometimes the manure is put under them. The sets are laid down at the average distance of sixteen inches by the setters, who move in a retrograde direction, and are provided with aprons to contain the sets. A sufficient number of men is in attendance to divide the manure evenly in the drills; the plough also is in the field in order that there may be the least possible exposure of the manure and sets to the sun or to parching wind, but the plough should cover the sets rather lightly in clay soil. The roller is next used to lay an even surface to the shooting plants, and to facilitate the subsequent progress of the paring plough, which is to be set to work when the stems are six or seven inches high, and should move as close to the plants as is practicable without injuring their tender fibres. The weeders should then hoe the plants carefully, and immediately afterwards (for the influence of wind or hot air on the roots is pernicious) the scuffler or drill-harrow is to follow, in order to clean and level the intervals, before the earthing plough, with either double or single mould-board, is introduced to apply fresh earth to the stems. As to the distance between the drills, due regard must be had to the natural quality of the soil and the quantity and description of manure available, or in other words to the probable luxuriance of foliage. Mr. Knight, aware of the necessity of allowing room in proportion to the figure and height of the plants, has laid down an exact rule thus:—'The height of the stems being three feet, the rows ought to be four feet apart:' but for a general average, thirty inches is the best distance. As to excess of foliage, we are certain that it is not desirable. The largest produce will be obtained from varieties of rather early habits and rather low stature, there being in very tall plants much time lost in conveying the nutriment from the soil to the leaves, and consequently strong and upright stems, which do not fall down and shade the others, are those which are desirable.

Two more earthings are usually given, but it is questionable whether even one be necessary in soil of average depth, unless there be a very wide interval between the drills, and it is certain that much earthing in dry and shallow soil is injurious.

In all cases the earth should be rendered as loose and friable as possible, by spade, hoe, or plough, and where labour is easily commanded, the spade will be found to be the more efficacious implement in the first course of treatment after the plants are well up.

In minute husbandry, such as that exemplified in labourers' allotments, which excludes the plough altogether, the ordinary and best practice is to lay the sets in rows, after a very deep winter digging, marked with a garden-line. The workman digs precisely as in a garden-plot for cabbages: he clears a little drill, lays the sets straight, puts a sufficiency of manure over them, and then covers from the next spit, which he digs with a spade or three-pronged fork flattened at the ends, levelling and pulverising as he advances to the distance at which he again puts down his line and forms a new drill. Thus the entire piece is thoroughly loosened, the manure perfectly covered, and every facility given for the hand-hoeing in due course.

The next stage of the potato is that in which it blossoms. It has been recommended to pluck off the flowers. Excessive blossoming is no doubt injurious, but experience has generally proved that the extra cost is hardly defrayed by the additional produce obtained. If the flowers are plucked off they should be nipped in the early bud.

When the potatoes are ripe, which is indicated by the withering of the stalks, the crop may be taken up either by the plough (after the stalks with any tubers that may be attached to them are pulled up), or by prongs or long narrow spades without the plough. In wet weather this more tedious but far safer method is frequently adopted, and if the drills be short and the head-riggs under crop also, it is the most desirable, effectual, and economical mode.

The general mode of securing the crop in pits in the field is the safest. In making the pits—improperly so termed, for the base is only sunk a few inches, and the potatoes are raised considerably in the heaps—the only caution to be observed is that furrows should be cut on all sides to prevent water from lodging or penetrating inwards, and that the earth thrown up and over them to the depth of four or five inches, should be well beaten with spade or shovel to exclude moisture and frost. The potato-stalks, however apparently dry, should never be laid between the potatoes and the earth in these accumulations, for they soon ferment and rot, and injure all the potatoes in contact with them. Straw also is at least useless.

The only decided diseases of the potato are the Curl, which is an imperfect formation, and the Rot, or Potato Disease, as it has been called. Neither

the causes of these diseases nor any certain remedy have yet been discovered. It seems however that when the cut sets have failed, the entire tubers have resisted premature decay. Whether it arises from atmospheric influence or debility of constitution or from any other conjectured cause, the entire tubers better resist these noxious influences, and germinate more healthily and freely.

The farina of the potato, properly granulated and dried, is sold in our shops as tapioca, to which it bears the closest resemblance both in appearance and essential properties. For confectionary the flour is so delicately white, and it is so digestible and nutritious, that it ought to be in more general use, among the children of the poor especially, in the winter season, when they so rarely enjoy the luxury of milk; and the cost is not more than a sixth or seventh of the price of tapioca or arrow-root, if it be made at home. Few housewives are ignorant of the method of obtaining it by the use of a common hand-grater and sieve; but for yielding larger supplies some machinery is necessary.

POTEMKI'N, GREGORY ALEXANDROVITZ, PRINCE, born near Smolensk, of a noble though poor family, entered the army at the age of eighteen, and obtained a cornetcy in the Russian guards. When the Revolution took place at St. Petersburg, in 1762, Potemkin took the part of Catharina, and became her favourite. But he had better claims to favour than mere personal attractions, and long after he ceased to charm the empress, he remained her confidential minister and trusty adviser. In 1787, war having broken out again between the Porte and Russia, Potemkin was made commander-in-chief of the Russian armies. In 1788, Oczakow was taken by the Russians, and Ismael in the following year. In 1791, Potemkin left the army, and returned to St. Petersburg to enjoy his triumphs. He attended the congress of Jassy in 1792, but fell ill of an epidemic which was raging at that time, and died on his road to Nicolaieff, in Oct., 1792, at 52 years of age, and in the enjoyment of a vast number of titles and distinctions. His remains were moved to Kherson, where a mausoleum was raised to him by order of Catharina.

POTENTILLA, a genus of plants belonging to the natural order *Rosaceæ*. *P. reptans*, Creeping Cinquefoil, is a common British species; it is found likewise in other parts of Europe. It appears to have been formerly used medicinally, and is still employed as a febrifuge by some practitioners. *P. tormentilla* abounds in Great Britain. The roots are very astringent, and have been used medicinally. In the Western Isles of Scotland and the Orkneys they are used for tanning leather, and are preferred even to oak-bark. They are also used for dyeing a red colour. *P. anserina* has roots which are eaten both by hogs and men; they taste like a parsnip, but are small; the common people roast or boil them for food. In the islands of Tiraee and Col they answer in some measure the purposes of bread, and have been known to support the inhabitants for months together during a time of scarcity.

All the species of Potentilla are of easy cultivation, and some of them are handsome when in flower.

POTENZA. [BASILICATA.]

POTE'RIUM, a genus of plants belonging to the natural order *Rosaceæ*. *P. sanguisorba*, Lesser Burnet, is a native of Britain. It forms a useful fodder for cattle, and at one time was extensively cultivated for that purpose, but is now generally superseded by sainfoin and other artificial grasses. On the continent, and occasionally in this country, the young leaves are eaten as salad.

POTHIE'R, ROBERT JOSEPH, born at Orleans in 1699, studied in his native town, and adopted the profession of the law. He was made conseiller au chatelêt (court) of Orleans, and was afterwards appointed professor of French law in the university of that city. Pothier was a voluminous writer on law. He published an edition of the 'Digest,' arranged in a new order, 3 vols. folio, Paris, 1748-52; and he wrote treatises on many branches of law, one of which, 'Traité des Obligations,' was translated into English by W. D. Evans, 2 vols. 8vo., London, 1806, under the title of 'A Treatise on the Law of Obligations or Contracts.' The compilers of the French Code Civil, made much use of Pothier's treatises, and he is the great authority on Roman Law to modern French jurists; but, though Pothier would make a respectable figure among the jurists of any nation, to consider him as an original authority, and to appeal to him alone, is only a proof of the poverty of the juristical literature of a nation. Pothier's 'Coutûme d'Orleans' 1760, is a valuable treatise on the old French law. He died at Orleans in 1772. His posthumous works were published at Paris, 3 vols. 4to., 1777. Pothier possessed enlarged and liberal views on criminal jurisprudence, and disapproved of the torture and other absurd practices of the old criminal procedure in France.

POTOMAC. [MARYLAND.]

POTOSI', a town in South America, in the republic of Bolivia, and in the department of Potosi, is built on the south-western declivity of the Cerro de Potosi, in 19° 36′ S. lat. and 65° 20′ W. long., at an elevation of 13,265 feet above the level of the sea. It is built on an uneven site, and the streets are consequently irregular, but they are tolerably wide and clean. Many of the houses are large, and most of them substantial. On one side of the principal square stands the government-house, a long low range of buildings, including the courts of justice, the gaol, and the guard-house. Opposite to it is the cathedral, an immense edifice, which has very little claim to architectural beauty. The mint also is very large, but far from being a fine building. The great square contains a monument erected in honour of Bolivar. The mountain, or Cerro de Potosi, is 16,037 feet high. It contains one of the richest silver mines in the world; the mine has yielded since 1556 an amount of silver worth nearly 200,000,000*l.* sterling. Potosi contains about 30,000 inhabitants.

POTSDAM. [BRANDENBURG.]

POTSDAM, the chief town of the government of Potsdam, in the Prussian province of Brandenburg, is situated on an island in the Havel, at the

point where that river is joined by the Nuthe, and 16 miles by railway S. W. from Berlin. It is, next to Berlin, the handsomest and best-built town in Prussia, a distinction for which it is indebted to its being the occasional residence of the court. The streets are regular and broad, and there are some good squares; the town is surrounded by a rampart, and has nine gates, of which the Brandenburg Gate is a handsome triumphal arch. Among the public buildings the following are the most worthy of notice:—the royal palace, in the old town; the town-hall, built after the model of that of Amsterdam; the theatre; the poor-house and infirmary; the military orphan asylum; the garrison church, which contains the tombs of Frederick William I. and Frederick II.; the church of the Holy Ghost, with a fine steeple 280 feet high; the French Protestant church, built on the plan of the Pantheon at Rome; and the barracks. The principal manufactures are silk, cotton, linen, woollens, leather, hats, hosiery, musical instruments, fire-arms, and carriages. In the vicinity of Potsdam are numerous agreeable promenades.

POTT, PERCIVALL, was born in London in 1713. He was intended for the Church, in which, under the patronage of his relation, the bishop of Rochester, he had good prospects of preferment; but nothing could induce him to give up his inclination for surgery. He was accordingly, in 1729, apprenticed to Mr. Nourse, a surgeon of St. Bartholomew's Hospital, of which institution Pott himself became surgeon, in 1749. In 1756 he received a severe compound fracture of his leg, and during his confinement he commenced writing the works for which he has since been celebrated. His first publication was a 'Treatise on Ruptures;' in 1757 he wrote on Hernia Congenita, in 1758 on Fistula Lacrymalis, in 1760 on Injuries of the Head, in 1762 on Hydrocele, in 1765 on Fistula in Ano. In 1787, his time being fully occupied in private practice, he resigned his hospital-surgeoncy. In 1788 he died. His works were published collectively in several forms after his death; the best edition is that edited by Mr. Earle, in 3 vols. 8vo., London, 1790, and in subsequent years.

POTTER, JOHN, D.D., born 1674, died 1747, was born at Wakefield, in Yorkshire, and educated in the grammar-school of that town. At the age of 14 he entered as servitor of University College, Oxford; took the degree of B.A. in 1692, and in 1694 became fellow of Lincoln College. He was early distinguished for his classical attainments. His edition of Lycophron and his Archæologia Græca, or Antiquities of Greece, were both published in 1697, when he was 23 years of age. The 'Antiquities of Greece' shows the author's learning more than his judgment. The work has been often reprinted, but is now considerably behind the philological knowledge of the day. In 1698 he entered into holy orders, and in 1715 he was made bishop of Oxford. In this year he published an edition of Clemens Alexandrinus, 2 vols. folio. In 1737 he was made archbishop of Canterbury. His theological works were published at Oxford, in 3 vols. 8vo., 1753.

POTTER, ROBERT, was born in 1721, educated at Emanuel College, Cambridge, and took his degree of B.A. in 1741. He was successively appointed vicar of Scarning in Norfolk, prebendary of Norwich, and vicar of Lowestoft and Kessingland, in the diocese of Norwich. He died August 9th, 1804, in his 84th year.

Potter published a volume of poems in 1774, and translations of Æschylus in 1777, of Euripides in 1781–82, and of Sophocles in 1788. Of these translations that of Æschylus is the best.

POTTER, PAUL, was born at Enkhuysen, in 1625. He was taught the rudiments of painting by his father, an artist of moderate ability. He established himself at the Hague, where he was greatly patronised by Maurice, Prince of Orange, for whom he painted some of his finest pictures. He was naturally of a delicate constitution, which by his unremitting attention to his art he greatly impaired, and died at Amsterdam, Jan. 15, 1654.

The chief excellence of Paul Potter consisted in his painting of cows, sheep, goats, and other animals, in which he makes his landscape a subordinate part, but the animals are executed with a correctness of drawing and a delicacy of touch perfectly astonishing. He sometimes painted as large as life, but succeeded best in cabinet-sized works. There are many beautiful etchings by him, executed in a masterly style.

POTTERY and PORCELAIN. The art of moulding earthen vessels for domestic use appears to have been practised in the earliest ages, and undoubtedly has been known amongst the rudest nations. The most ancient records allude to the potter's wheel, and we have proof that great skill had been acquired in the manufacture of porcelain of a superior quality in China and in Japan at a very remote date. The little figures, covered with a fine deep-blue glaze, which are deposited with Egyptian mummies, and numerous jars, some specimens of which may be seen in the British Museum, show that in Egypt, likewise, the art was anciently practised. Vestiges of considerable Roman potteries have been discovered in many parts of this island. In newly-discovered countries it has been found that the use of earthen vessels is familiar among people otherwise little acquainted with the arts of civilised life.

Although *Earthenware* may be considered as a general term applicable to all utensils composed of earthen materials, it is usual to distinguish such utensils more particularly into three different kinds, namely, *Pottery*, *Earthenware*, and *Porcelain*. Under Pottery are classed the brown stoneware made into jugs, &c., red pans and pots, porous vessels, &c. Earthenware consists of the white, blue and white, and yellow ware, which is so extensively used in this country. Porcelain is distinguished from earthenware as being a semi-vitrified compound, in which one portion remains infusible at the greatest heat to which it can be exposed, while the other portion vitrifies at a certain heat, and thus intimately combines with and envelopes the infusible part, producing a smooth, compact, shining, and semi-transparent substance, well known as the characteristic of true porcelain.

Until the beginning of the 18th century, the

manufacture of earthenware in this country was confined to a few objects of the coarsest description, and till nearly the close of the same century, the porcelain of China was still in common use on the tables of the wealthy, the home manufacture being confined to articles of the commonest domestic use. Earthenware was likewise largely imported from Holland, and superior kinds from Germany and France. English earthenware and porcelain are now not only brought into general use in this country, to the exclusion of all foreign goods, but earthenware is also largely exported to almost every part of the known world, and even to those countries where the art was previously prosecuted. England is mainly indebted to Mr. Wedgwood for the extraordinary improvement and rapid extension of this branch of industry. Before his time our potteries produced only inferior fabrics, easily broken or injured, and totally devoid of taste as to form and ornaments. Wedgwood's success was not the result of any fortunate discovery accidentally made, but was due to patient investigation and unremitting efforts. He called upon a higher class of men than had usually been employed in this manufacture to assist in his labours, and in prosecuting his experiments he was guided by sound scientific principles; and signal success, which crowned his first exertions, only served as an additional motive for continuing his pursuit. One of the principal inventions of Mr. Wedgwood was his *table ware*, known at present as *Queen's Ware*. It is characterised as a dense and durable substance, covered with a brilliant glaze, and capable of bearing uninjured sudden alternations of heat and cold. Mr. Wedgwood's more beautiful inventions were—a *terra cotta*, which could be made to resemble porphyry, granite, Egyptian pebble, and other beautiful stones of the silicious or crystalline kind; a black porcelainous biscuit, very much resembling basalt in its properties, and therefore called Basaltes; a white and a cane-coloured porcelain biscuit, both smooth and of a wax-like appearance; and another white porcelainous biscuit, distinguished as jasper, having in general all the properties of the basaltes, with a very important addition, the capability of receiving through its whole substance from the admixture of metallic oxides, the same colours as those oxides communicate to glass or enamel in fusion. This peculiar property renders it applicable to the production of cameos and all subjects required to be shown in bas-relief, as the ground can be made of any colour, while the raised figures are of the purest white. Mr. Wedgwood likewise invented a porcelain biscuit, nearly as hard as agate, which will resist the action of all corrosive substances, and is consequently peculiarly well adapted for mortars in the chemist's laboratory.

As porcelain is only a finer kind of pottery, the following description will comprehend the mode of manufacturing both articles:—

The materials for earthenware are reduced to the consistence of cream, in which state they are called *slips* (slops); this fluidity is necessary to ensure the perfect mixture of all the ingredients, and their mutual chemical action in the fire. The basis of the composition is a clay from the plastic clay formation in Devonshire or Dorsetshire, to which is added ground flint, which gives whiteness and solidity to the goods. For the better kinds, a portion of China-clay, or decomposed felspar from Cornwall, is added, together with a small quantity of ground white granite. By this means the density of the ware is increased, greater purity of whiteness is obtained, and also a degree of vitrification which makes the ware sonorous when struck.

The flints employed are burned in a kiln, slaked to destroy their coherence, and ground to powder in a mill constructed for the purpose. The powder is then sifted in water, until reduced to a fit state for combination with the other substances. The clays are thrown into their several vats sunk in the ground, where they are blended with water, and sifted through fine silk lawns into other receptacles, and then diluted with water. The mingled flint and clay, in the state of a creamy liquid, is then pumped into a boiler, or slip-kiln, the bottom of which is formed of large flat fire-bricks, under which four or five parallel flues pass from the fire-place to a high chimney. The water is then evaporated, until the boiling mass is brought to a proper consistency for working; but the steam having given it a cellular and porous texture, it requires to be beaten or wedged until the air is driven out, and a section of the mass, when cut, is smooth and compact.

All the various kinds of ware, such as cream-coloured ware, drab-coloured ware, drab body, brown body, Egyptian black, blue body, jasper body, turquoise body, &c., are formed of different kinds and proportions of flint and clay, with small additions of colouring materials. Round articles, which may be turned upon a lathe, have their form given upon the thrower's wheel, which is a lathe with a vertical spindle, having a small round table on the top, at which the thrower sits. He receives the clay prepared to the proper size by a woman, called the baller, and throws it upon the whirling table between his knees, which is put in motion by the wheel-woman, whose eye watches every motion of the thrower, and regulates the velocity of the work with perfect accuracy. The thrower first draws the clay up into a pillar, then depresses it into a flat cake, until the whole mass has been drawn into a circular arrangement of all its parts. He then opens the hollow of the vessel with his thumbs, and continues to draw out the clay, or press it inwards, until the desired shape is given to it. It is then cut from the table by a brass wire, and placed on a board, which, when full, is carried into a stove-room to harden.

When a number of vessels of the same size are to be thrown, a gauge is fixed so that its point just touches the top edge of the article when it is revolving; this fixes both the height and diameter of all that are made after.

When the vessels are sufficiently hardened, they are turned upon a lathe similar to that used by wood-turners. The turner dexterously shaves away the clay to the proper thickness, and works the mouldings, &c., polishing the whole with a steel burnisher. He frequently ornaments bowls, jugs, &c., with a coating of various coloured clays,

which are sometimes blended with each other, so as to give a marbled surface. By these earthy pigments he produces an infinite variety of patterns. This kind is called *Dipped Ware.*

Such articles as require handles and spouts are then passed to the handler, who makes those appendages in plaster moulds, and sticks them to the vessels with liquid clay. Plain handles are pressed by a syringe through a hole of the proper size and form, and as the clay comes through in long strings, it is cut off, and bent into the desired shape for the handle.

Thrown and turned goods are sometimes ornamented with figures in relief, which are made out of flat moulds by children, and fixed upon the ware by workmen, who, having carefully adjusted each figure to its place, run a little water under it with a camel-hair pencil, which unites it to the surface of the pot. Goods of an oval or angular shape, which cannot be turned, are made by pressing clay into plaster moulds, which give the outside form to the vessels: this is called *Hollow-Ware Pressing.* Another kind, called *Flat-Ware Pressing,* is performed by giving the shape to the goods by moulds which fit the inside of the vessel; plates, dishes, saucers, cups, and hand-basins are made on this principle.

Casting is resorted to when a mould is so intricate as to be difficult for the workmen to fill by pressing. Slip clay is poured into the mould, which rapidly absorbs the water; and a coating of clay is deposited upon the inside; the remaining fluid is then poured out or drawn with a syringe, and a thicker mixture is put in, and left rather longer than the first before it is withdrawn. The mould is then put into a stove to dry.

When completed by the workman, the goods are placed on boards to dry, before going to the biscuit-oven, in which they receive the first fire. The ware to be thus burnt is placed in *Saggers* made of crucible clay; in shape they resemble hat-boxes, and being piled in columns, each sagger covers the one beneath it, and protects the goods from the immediate contact of smoke and flame. When the baking is finished and the oven cooled, the doorway is opened, the saggers brought out, and their contents submitted to a rigid scrutiny: all cracked and crooked pieces are rejected and thrown away. The ware is now called *Biscuit,* and in this state goes to the printer or biscuit-painter to be ornamented.

The printing of earthenware is effected by transfer-papers from engraved copper-plates. The ink used in printing is made of linseed-oil, boiled with litharge, rosin, balsam of sulphur, or Barbadoes tar, and is tinted with any of the usual mineral colours—blue being the principal, and formed of oxide of cobalt. The colour having been ground very fine, the printer blends it with his oil upon a hot stove, and filling the engraved plate with it, takes off the impression by the common rolling-press. The tissue-paper used for this purpose is first prepared with a solution of soap. As soon as the print is taken, a girl cuts out the engraving with scissors, and hands it to the transferer, who carefully places the print upon the biscuit-ware, which being absorbent, holds it with great tenacity. The transferrer then passes it to her assistant, who with the end of a cylinder of flannel, tightly rolled and bound with twine, rubs the print with such force as to work the ink into close contact with the biscuit. The goods thus coated with paper are then put into a tub of water, and the paper being wiped off with a sponge, every minute point of the engraving is found accurately transferred to the earthenware. When dry, the goods are packed close in a large muffle, or kiln, round which a fire circulates, and brings the whole to a low red heat. By this means the oil is burned out of the colour, which would be injurious to the process of glazing which follows. Some patterns are executed on biscuit by painters, who lay on the colours in gum-water.

The biscuit-ware, thus ornamented, is carried to the dipper, who dips each piece into the tub containing the finely-ground mixture which, when melted, forms the glassy coating to the ware. This glaze is blended in water, which, being absorbed by the biscuit, leaves a thin cover of glazing-powder upon the surface; a dexterous shake of each piece in a circular motion, as it emerges from the fluid, prevents the glaze from setting unequally, and throws off all that is superfluous. The material of the glaze differs according to the kind of ware: white-lead is a general ingredient.

When the goods have been dipped in the glazing mixture, they are dried, and placed in saggers, which are washed on the inside with a compound of glaze with lime and clay. Every piece is carefully placed so as not to touch another; otherwise, when the glaze melts, they would stick together. When drawn from the oven, the ware is carried in baskets to the glossed warehouse, where it is again subjected to a close examination.

Porcelain is a finer species of pottery, in which the ingredients are so contrived that they act chemically upon each other, and are brought to a state of vitrification; the fracture has a dense or greasy surface, like that of a flint stone, and is therefore not liable to be acted upon by acids. When the porcelain is coloured by metallic matter, it is called *stone-ware; jasper* and some drab-ware are of this description: but when it is perfectly free from colouring matter and is translucent, it is called China; of which there are two species, hard and soft china.

Hard China is formed chiefly of Kaolin or Cornish clay, felspar, sand, and selenite; but Soft China, which is more frequently made in England, has a different composition. Bones calcined and ground are largely used in the manufacture of English china, combined with aluminous and silicious earths in such proportions that they will vitrify together. The mode of mixing the materials, and the general processes of manufacture, are nearly the same as for earthenware.

The decoration of china by enamel colours and gold affords employment to a great number of both sexes, some of whom attain great excellence in their beautiful art. The colours used are all prepared from metallic oxides, which are ground with fluxes, or fusible glasses, of various degrees

of softness, suited to the peculiar colours with which they are used. When painted, the goods are placed in the enamel-kiln, where the fluxed colours melt, and fasten to the glazed surface, forming coloured glasses. The gold, which is applied in the form of an amalgam ground in turpentine, is afterwards burnished with steel burnishers.

Pottery, comprising the coarsest and commonest wares, involves the use of clay only, and requires much less careful processes than porcelain or earthenware.

According to the census of 1841, the number of persons in Great Britain employed in this manufacture was 24,774, of whom 17,442 were returned for Staffordshire, which is the great seat of the manufacture. The district in this county known as 'The Potteries,' lies a few miles from the borders of Cheshire, and extends through a distance of more than seven miles, in which there are towns and villages so close to each other, that the whole appears like one straggling town.

The porcelain, earthenware, and pottery, exported from the United Kingdom in 1846, amounted to 65,056,956 separate pieces, valued at 793,166*l*. In 1847, the value was 834,357*l*.

POTTING OF PLANTS. When plants are placed to grow in a small earthen vessel, like a garden-pot, their condition is very different from that to which they are naturally exposed. It is therefore the object of the gardener to obviate as much as possible the evils arising from the confined situation of the plants, and at the same time to secure the advantages to be derived from the operation itself. Exhaustion of the soil is one of the inconveniences which result from this system. In order to remedy it, liquid manure should be applied to the plants, or the pots should be placed in pan-feeders, shallow earthen vessels containing manure, to which the roots have access through holes in the bottom of the pot. It is however to shifting more particularly that recourse should be had for renovating the soil; and this, if skilfully performed without injuring the plant, is most successful. All the earth which clings to the roots should be carefully separated before the plant is placed in the fresh soil. The roots of a plant are always found to be in contact with the sides of the pot, and this, being generally composed of a highly absorbent substance, is subject to great variations of temperature. The best mode of counteracting the injurious effects of unequal temperature is by the use of double pots, the space between the two pots being filled with moss or some other substance retentive of moisture. The drainage of potted plants is of great importance, and in all cases a quantity of broken pieces of tiles and earthenware should be placed at the bottom of the pots to prevent the stagnation of water about the roots. To be managed perfectly, a young plant should be placed in as small a pot as it will grow in, and gradually and successively transferred to large pots as it advances.

POTTO, the *Yellow Macauco* of Pennant, regarded by modern naturalists as the Kinkajou (*Cercoleptes caudivolvulus*), an animal allied to the Coatis and Racoons.

'The Kinkajou,' says the writer of the 'Pictorial Museum of Animated Nature,' 'is a native of southern and intertropical America, where it appears to be extensively spread, and is known under different appellations. In its manners it much resembles the Coati-Mondi (*Nasua*), but differs from that animal not only in the shape of the head, which is short and compact, but also in having a prehensile tail. Of recluse and solitary habits, the Kinkajou lives for the most part among the branches of trees in large woods or forests, and is in every respect well adapted for climbing; being however decidedly nocturnal, it is but little exposed to the observation even of those who sojourn among the places frequented by it. During the day it sleeps in its retreat, rolled up like a ball, and if roused appears torpid and inactive. As soon however as the dusk of evening sets in, it is fully awake and active, displaying the utmost restlessness and address, climbing from branch to branch in quest of prey, and using its prehensile tail to assist itself in its manœuvres.'

In size the Kinkajou is equal to a full-grown cat, but its limbs are much stouter and more muscular, and its body more firmly built. In walking, the sole of the foot is applied fairly to the ground, as in the case of the Badger. The tongue is endowed with remarkable powers of extension, and according to Humboldt, it uses this organ not only in obtaining the honey of the wild bee, but in probing holes where birds may have made their nests. Habits carnivorous and daring. In captivity it soon becomes playful and familiar.

POTTON. [BEDFORDSHIRE.]

POULTICE. [CATAPLASM.]

POULTON. [LANCASHIRE.]

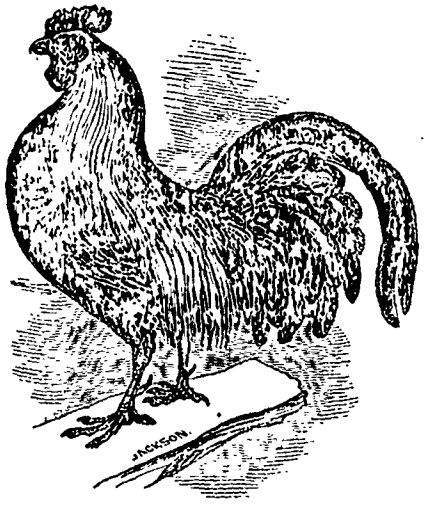
POULTRY, from the French *Poulet*. The term includes all the domesticated birds reared for the table—fowls, turkeys, geese, ducks, and Guinea fowls.

Fowls. [GALLINÆ.]—Those who intend to rear fowls or any kind of poultry, on a large scale, should have a distinct yard, well sheltered, and with a warm aspect, fenced, and sufficiently inclined to be always dry, and supplied with sand or ashes for the cocks and hens to roll in, an operation necessary to disengage their feathers from vermin: running water should be especially provided; for the want of water, of which all poultry are fond, produces constipation of the bowels and inflammatory diseases; and for geese and ducks bathing is an indispensable luxury. A contiguous field is also useful for free exercise. The fowl-house should be dry, well-roofed, and fronting the east or south, and, if practicable, at the back of a stove or stables; warmth being conducive to health and laying, though extreme heat has the contrary effect. It should be furnished with two small lattice windows, that can be opened or shut at pleasure, at opposite ends, for ventilation; and the perches should be so arranged that one row of roosting fowls should not be directly above another.

The nests, if built into the wall, are in tiers from the bottom to the top, the lowest being about three feet from the ground, and a foot square. If the laying-chambers consist of wooden boxes, they are usually furnished with a ledge, which is very

convenient for the hens when rising. But the best receptacles for the eggs are those of basket-work, as they are cool in summer, and can easily be removed and washed. They ought to be fastened not directly to the wall, as is generally the case, but to boards fixed in it by hooks, well clinched, and with a little roof to cover the rows of baskets. They will thus be isolated to the great satisfaction of the hen, which delights in the absence of all disturbing influences when laying. All the ranges of nests should be placed cheque-wise, in order that the inmates, when coming out, may not startle those immediately under. Those designed for hatching should be near the ground (where instinct teaches the hen to choose her seat), and so arranged that the hens can easily enter them without disturbing the eggs. Wheaten or rye straw is the most approved material for the bedding, being cooler than hay.

One cock, where there is plenty of room, is considered in the poultry districts contiguous to London as sufficient for six or seven hens, but in a confined yard five hens are sufficient for one cock. When there are two or more cocks, care should be taken not to have them of equal age or size, for in this case they are always jealous and quarrelsome; but, if one is decidedly ascendant, the other will never presume to dispute with him. As a general rule it would be well to have one a yearling and the other a year older. In the third year the cock, who then becomes very jealous, should be killed.



Game Cock.

In selecting eggs for hatching, care should be taken that they are not at the utmost more than a month old; but their condition for hatching will greatly depend upon the temperature of the weather: vitality continues longest when the air is cool. The number of eggs for a hen should not exceed sixteen, as she cannot impart the necessary warmth to more. The eggs are hatched generally in 21 days. The practice of the Surrey breeders is

to feed the hen on oats while sitting, as less stimulating than barley, which they give to the laying hens on account of this very quality.

Some persons use artificial mothers, which effect the purpose of imparting the necessary heat to the young chicks after birth, when there is no natural mother nor a trained capon to brood them. These artificial mothers are boxes lined throughout with wool. The artificial mother, however, is only a mechanical house for chicks already hatched; but the process of bringing the embryo of organised life in the egg through all the stages of the vital principle, until it becomes matured, by means of heated ovens, has been long and successfully practised in Egypt. One hundred millions of chickens are said to be thus annually produced by this means in Egypt.

The attempt to pursue the Egyptian system failed in France, and there is no probability of its succeeding in the climate of Great Britain; but the application of the Eccaleobion machinery, exhibited in London a few years ago was quite successful. The eccaleobion machine, capable of containing 2000 eggs, resembles an oblong box, nine feet in length, three feet in breadth, and the same in height. It has no connection with the walls, against which it is placed or the table on which it stands; its regulating power is within. Another hatching-machine is now (Dec. 1849) exhibiting in London, by which chickens are produced in large numbers.

The exit of the chick from the shell is one of the most interesting processes of animated nature ever investigated by naturalists. It was supposed that the mother bird broke the shell; but M. Réaumur has long since detailed the processes, and we ourselves have witnessed the evolution of the chick in the eccaleobion by its own unassisted efforts. M. Réaumur thus explains some interesting facts:—'I have seen chicks continue at work for two days together. Some again work incessantly; others take rest at intervals, according to their physical strength. I have observed some, in consequence of their impatience to see the light, begin to break the shell a great deal too soon; for they ought, before they make their exit, to have within them provision enough to serve for twenty-four hours without taking food, and for this purpose the unconsumed portion of the yolk enters through the navel. The chick, indeed, which comes out of the shell before taking up all the yolk is certain to droop and die a few days after it is hatched. The help which I have occasionally tried to give to several of them towards their deliverance has afforded me an opportunity of observing those which had begun to break their shells before this was accomplished; and I have opened many eggs much fractured, in each of which the chick had as yet much of the yolk not absorbed. Besides, some chicks have greater obstacles to overcome than others, since all shells are not of an equal thickness nor of an equal consistence; and I think it probable that the same inequality takes place in the lining membrane. The shells of the eggs of birds of various species are of a thickness proportional to the strength of the chick that is obliged to break through them.' ('Domestic Habits

of Birds,' in 'Library of Entertaining Knowledge.') There is a caution to be observed in all cases regarding the eggs when the chicks are on the verge of maturity: they should not be stirred when within two days of the evolvement of the chicks. If any circumstances render it absolutely necessary to do so, care should be taken to place them with the broad end inclining upwards, as the beak of the chick is then in its proper position; if this be reversed, the chick becomes unable to chip the shell, and must therefore die.

Chickens should be fed the day after their birth with crumbs of bread soaked in milk, or with the yolk of an egg boiled hard; and they will quickly learn to eat curds, grits, barley-meal, and milk. If not designed for immediate use, they should soon get raw corn, and occasionally alteratives of green food, such as bruised lecks, nettles, lettuces, &c. For the first week they should be confined to the house altogether; after that time they may be let out for a short time in the sun, and gradually habituated to the weather.

Poultry are the better for high feeding from the very shell, and on this account the heaviest corn is often far cheaper for them in the end than tailings, as regards the flesh, or the size and substantial goodness of the eggs. Young chickens may be put up for feeding as soon as the hen has ceased to regard them, and before they lose their first good condition. When chickens are wanted for domestic purposes, they are often left at liberty in the farm-yard, and if they have plenty of good food they will be in the most healthful state for the table, and rich and juicy in flavour. Mr. Moubray ascertained that pullets hatched in March, if constantly high fed, laid eggs abundantly in the autumn; and, if killed in the February or March following, were so excessively fat from the run of the yard as to open more like Michaelmas geese than chickens.

As soon as fowls are rendered sufficiently fat, they should be killed, or they will lose flesh and become unhealthy. The most humane and expeditious mode of putting them to death is by a smart blow with a blunt-edged stick, such as a child's bat, at the back of the neck. Higglers break the vertebræ of the neck by a sudden twist, and never bleed fowls, as this mode of dispatching them dries up the juices of the flesh. They bleed turkeys and geese, however, after a stunning blow in the neck, not by cutting the throat, but by an incision in the upper part of the mouth.

Store fowls will feed well upon the tailings of corn, potatoes, and insects, and require little attention except when laying, during which time the food for the hens should be abundant, and their roosting-places dry and warm.

The diseases of all poultry principally arise from cold and moisture. Rheumatism decidedly arises from this cause. During or after moulting in a wet season, fowls frequently become diseased, as is evident from their drooping appearance, swelled and watery eyes, and the dropsical affections of the legs. Severe laying also sometimes causes emaciation and illness, which give way to a more healthy condition after the moulting season, if they have good food and dry weather.

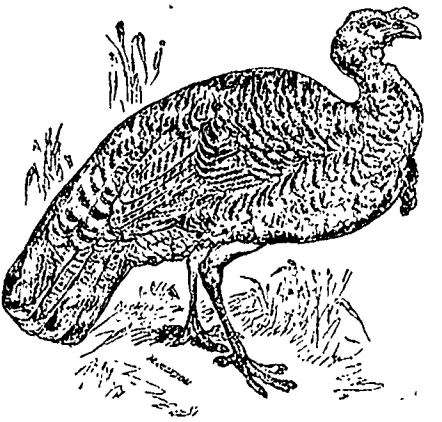
Chickens are very subject, in wet or variable weather, to a disease called the Chip, which appears in about a fortnight after their birth, when they are changing their feathers. Warmth and sunshine are the only restoratives within our knowledge.

The Roup is properly an imposthume upon the rump, which is cured or relieved by opening, squeezing, and bathing with warm water. Roup however is a term also applied to catarrh, which is indicated by watery eyes and running at the nostrils. This last disease resembles glanders in horses, and is infectious, and generally fatal. As all these diseases originate in moisture, dryness and warmth are the best counteracting influences.

The Pip, which is probably a modification of roup, is cured by an application of powdered borax dissolved in tincture of myrrh and water, and rubbed on the tongue with a camel-hair brush two or three times a day. This at the same time assists the bowels. The Flux is not uncommon. Solid corn is the most certain remedy for this disease. Taken at the commencement, it is rarely serious, but if once established in the constitution it becomes incurable, and, according to some, contagious. For Constipation, bran or pollard, with milk, beet leaves, and lettuces, afford a certain cure.

Much of the foregoing matter applies to the rearing and management of all poultry.

Turkeys. [PAVONIDÆ.]—Turkeys, though very delicate in their infancy, become hardy, and, if permitted, will roost on the highest trees, in the cold dry nights of winter without suffering injury. The hen, which lays many eggs early in spring, sits thirty days, and covers from twelve to fifteen eggs. It is unnecessary for the turkey-cock, as is the case with gallinaceous fowl, to be in constant intercourse with the hen during her period of laying. Two visits from him in that season are sufficient to impregnate all the eggs. She is a very steady sitter, and must be removed to her food and supplied with water, for she would never leave her nest. She wants the alertness and courage and sagacity of the common hen, and might be called a fool with much more propriety than the goose, which is an intelligent bird. The turkey-hen is incapable of teaching her young ones how to pick



Wild Turkey.

up their food, on which account a poultry-maid should always attend them until they are reared.

On account of the constitutional delicacy of this bird, the hatching should not be commenced too early in the spring, and when the chicks are hatched they should be guarded from the extremes of heat and cold for some weeks. Rain is almost always fatal to them in their early stage. Curd, boiled eggs, barleymeal, and oatmeal, kneaded with milk (or water, in case milk should produce looseness), potatoes, nettles, parsley, Swedish turnips, with chopped beet-leaves, after a little time, is their proper food. As they retain so much of their original wild nature as to stray a considerable distance, if permitted, the hen should be tied or cooped for at least six weeks, when the chicks will be hardy enough to follow her about, under the vigilant eye however of the poultry-maid, who should beware of their being caught by a shower.

They are soon familiarised to the society of fowls in the poultry-yard or farm-yard. Without the advantage of the farm-yard, it is an unprofitable speculation to rear any poultry on a large scale; but where a farm-yard presents its facilities, the economy of having all those kinds to which the soil and climate are suitable is considerable. The only caution with regard to turkeys, where gallinaceous birds are numerous, is to have separate houses for them at night. These should be very lofty and well ventilated. They may be altogether open to the air in front, the doors being of trellis-work. Fowls have a strong disinclination to roost with turkeys.

When well grown, turkeys supply themselves in their ramblings so far as to require food only when leaving their house in the morning and returning at night.

After six months turkeys may be crammed, as is sometimes practised with fowls, but they require a much longer period to render them fully fat.

Guinea Fowl—This bird, which is not much larger than the common barn-door fowl, is of beautiful form and plumage, and though not a source of profit to the peasant who rears poultry for immediate sale, is usually kept where there is proper accommodation, as much on account of the excellence and abundance of the eggs (which, though small, are well-flavoured) as for the sake of the flesh, which is prized in the London markets when the season of pheasant-eating ceases. The number of hens allowed to the male is about the same as among the gallinaceous family. The cock, little distinguished in appearance from the female, is an attentive and affectionate mate.

Guinea Fowl.

Retaining some of their original wildness, Guinea fowl dislike the confinement of a house. For the purpose of laying they prefer shrubberies, clover-meadows, or corn-fields, in which they will deposit their eggs, unless closely watched. The Guinea hen is fruitful during the entire summer, but not earlier than May. On this account and the difficulty of rearing a late brood, it is more beneficial to keep her entirely for laying, and to put the earlier eggs under a common hen, which will cover from twenty to twenty-five, than to encourage the incubation of the natural parent, which is moreover indisposed to it, especially if under cover. If left to her instinct, this bird would at a late season, in the open air, sit for the natural period, which is twenty-eight or twenty-nine days.

The cock, having the same dislike to incubation which characterises the male of pea-fowl, will destroy the eggs if he can discover them. Though the shell is remarkably hard, the chicks break through it at the proper moment, and are soon after as vigorous and ready to eat as the young of any other tribe of poultry.

The same food which is suited to the young of gallinaceous fowls and turkeys is good for the chicks of this kind; but as they are not often destined to the coops for fattening, a good deal of garden or field green-food may be combined with their grits, &c., after the first month. They have a great relish for insects of every kind, and thrive upon them as well as upon hemp-seed. When designed for the table, they ought to be killed at an early age, at which time the flesh is more juicy than that of other poultry of the same age, and very like that of the pheasant, though when old it becomes exceedingly tough.

Ducks. [DUCKS.]—The white duck, being the largest of the domesticated kinds, is perhaps the best for the poulterer, though it is not deemed so delicate in flavour as the dark-coloured. One drake is sufficient for five females. It is generally believed that the duck lays no more eggs than she can cover (from twelve to fifteen), but if well fed some ducks will lay a great number, and there are instances of an egg being laid every day for 70 or 80 days.

For a fortnight after their birth ducklings should be kept from rushing into water, to which their instinct soon leads them; and with this view the mother is frequently confined (where there is any pond within her reach) to a coop, which should be placed on a field of short grass with a flat dish of water near it. The ducklings waddle about in search of insects, and at the maternal call return to the coop. It is very common to place duck-eggs under a hen, on account of her excellent qualities as a nurse.

Any kind of meal is good for ducklings at first,

and this may soon be mixed with potatoes. The refuse of the kitchen will not only support but fatten them; but to have them quickly and highly fattened, they should have oatmeal made into paste. They will also devour any animal offal, and have no fastidiousness whatever. If allowed to follow a plough or attend on the gardener when his spade is at work, their greediness and activity in picking up worms are extreme; and for gobbling up snails and slugs and other such delicacies in the field or garden they are most useful, while they are at the same time putting themselves into high condition. Having no fastidiousness of appetite, they never require cramming.

In a poultry-yard the ducks and geese are frequently lodged on the lower floor of the fowl-houses, but it is better, if the locality will permit, to give them distinct chambers, particularly where a good pond (free from eels) is available; on the margin of this their huts may be placed with very trifling labour, and an invisible paling all round the water, constructed at bottom on the principle of the cage-trap, so as to prevent the ingress of rats or weasels, while it affords them a ready outlet, renders this department of the poultry establishment complete, though far too expensive for common adoption.

Geese. [Goose.]—The proportion of females to the males is the same as in the ducks, and the period of incubation and the number of eggs that may be set correspond exactly. The goose lays in a mild spring very early, and on this account (but only with high corn-feeding in the previous winter, and stimulating food during the entire breeding season,) two broods may be had in the same year. The gander is very attentive to the hatching birds, whom he vigilantly protects as he sits patiently by; nor is his protection, as he accompanies the goslings in due course, less creditable to his paternal character. The goose is a very steady sitter, but usually rises often enough to drink and take sustenance, without its being necessary to remove her from her nest for the purpose.

The early treatment of the goslings is similar to that of ducklings. The mother should be penned up for some days upon dry grass, but neither too early nor very late in the day; beet leaves or other green food may be mixed even with the early diet, if immediate fattening be not the object. Green geese can be made quite fat with oatmeal and peas, and skimmed milk or butter-milk, when from four to six months old; many prefer oats alone.

The grand object of preparing, not geese only, but poultry in general, for market, in as short a time as possible, is effected solely by paying unremitting attention to their wants; in keeping them thoroughly clean; in supplying them with proper food (dry, soft, and green), water, exercise-ground, &c.

Though young geese are subject to a disease called the Cramp, the greater number of those which die in summer are destroyed by starvation, and the change from corn, and other nutritive food, to the miserable herbage which the fields and commons yield; and this constitutes their chief diet until the harvest season. Cold and wet weather are often fatal to them in the earlier months, if they be neglected. Much mortality also prevails amongst grown geese, wherever the cruel system of plucking them alive prevails, as in Lincolnshire and in Ireland.

Eggs.—The most certain way of preserving eggs fresh is by smearing them with some unctuous matter, or immersing them in a strong solution of lime. In packing, they should be laid on end; for otherwise the yolks, preserving their centre of gravity, fall to the lowest side, and by adhesion to it become tainted sooner than if they were suspended in the centre.

POUND. [Weights and Measures.]

POUSSIN, NICHOLAS, was born at Andely, in Normandy, in 1594, of a noble but reduced family. An artist named Quentin Varin, taught him the rudiments of painting, and in Paris he received lessons from Ferdinand Elle, a Flemish portrait-painter. In 1624 Poussin went to Rome, where, after having to contend against many pecuniary difficulties, he was liberally patronised by the cardinal Barberini, for whom he painted his celebrated picture of the Death of Germanicus, and the taking of Jerusalem by the Emperor Titus. His patron also procured for him the commission to paint a large picture of the Martyrdom of St. Erasmus, for St. Peter's, which is now in the pontifical palace of Monte Cavallo. These productions recommended him to the Cavaliere del Pozzo, for whom he painted his first series of the Seven Sacraments of the Church of Rome. The second series, executed from 1644 to 1647, with variations, was purchased by the Duke of Bridgewater from the Orleans Gallery, and afterwards passed into the collection of Lord Francis Egerton.

The celebrity which Poussin had now attained induced Louis XIII., in 1639, to desire his return to France, which took place in the following year, when he was appointed principal painter to the king, and had apartments assigned him in the Tuileries. The criticisms of his brother artists however upon his subsequent works, excited his disgust, and in 1642 he quitted his country with a determination never to return. He resided in Rome, passing his time in diligent practice of his art, and in the strictest simplicity of living, until 1665, when he died.

POUSSIN, GASPAR, was born at Rome, in 1613. His family was French, and bore the name of Dughet, but Nicholas Poussin having married his sister, he acquired the appellation of Gaspar Poussin. He studied under his brother-in-law, by whose advice he adopted landscape painting, and soon became one of the most celebrated practitioners in that branch of art. His pictures are sometimes embellished with figures by Nicholas Poussin, usually representing some subject of history or fable. There are a few slight but masterly etchings by this great artist. He died at Rome, in 1675.

POWER. In algebra the fourth power of x means the product of four $x$es, or $x \times x \times x \times x$; and the same of other powers. But it is far more symmetrical to begin from unity; and to say that the fourth power of x is the result of four multi-

plications by x, unity being understood as the commencement. Thus the successive powers of x, first, second, third, &c. are $1 \times x$, $1 \times x \times x$, $1 \times x \times x \times x$, &c.: denoted by x^1, x^2, x^3, &c. And the term *root* is the inverse of power, as follows:—If A be the mth power of B, B is the mth root of A, denoted by $^m\surd A$.

POWER is a term applied to any cause which is capable of producing motion, or of resisting motion; but the word has a merely technical meaning in treatises of mechanics. From among the numerous combinations which occur in machinery, the Lever, Inclined Plane, Wheel and Axle, Pulley, Wedge, and Screw, have been selected, and named Mechanical Powers, apparently because they are the simplest objects by which are produced such effects as could not be produced by the unassisted or unadapted operations of a motive agent, as gravitation, muscular strength, &c. The word Power here may be conceived to signify that which produces a mechanical advantage; but the same word may be used to signify a beneficial effect, as when a thing is done quicker or better at an equal expense of labour or time.

The mechanical advantages of simple machines are shown under the words LEVER, WHEEL AND AXLE, &c.; see also MECHANICAL POWERS. Beneficial effect may be produced in various ways without mechanical advantage:—for example, in the division of labour there is not only the moral benefit, namely, the making a human agent fitter for his work by giving him a more limited range of operations, but the actual saving of the labour of laying down one tool and taking up another.

The insufficiency of the common notion, that, by the use of machinery, what is gained in power is lost in time, may be well illustrated by the following cases. Suppose a crane were made to raise, by the exertion of one man, five hundredweight to a given height; suppose also that the five hundred-weight were divided into ten equal parts, and that each part were raised to the same height without the aid of any machine by the action of one man. In the latter case the end would be gained without encountering the resistance caused by friction, &c., in the machine; and it might be said that the use of the machine would have been accompanied by a loss of the power which must have been exerted to overcome that friction. But, by the use of the machine, the necessity of dividing the burthen would have been avoided, and the labour thereby saved might be many thousand times greater than the resistance arising from the friction of the machine.

POWER OF ATTORNEY. [LETTER OF ATTORNEY.]

POWERS. (Law.) [USE.]

POZZO DI BORGO (sometimes BARGO), CARLO ANDREA, was born, March 8, 1764, at Ajaccio, in Corsica. Pozzo attached himself to Paoli, and at the commencement of the Revolution was sent on a mission to Paris. This mission led to his being nominated a member of the Legislative Assembly, which commenced its sittings in Oct. 1791. When the Assembly was dissolved, in Sept. 1792, he returned to Corsica, and joined Paoli in those efforts by which he accomplished the liberation of his country for a season from France, and placed it under the protection of England. [CORSICA; PAOLI.] When the English abandoned Corsica, in 1797, Pozzo came to England, where he was considered as the principal adviser and agent of the French refugees; and it is from this period of his life that we may date the commencement of his diplomatic career. In 1799 he proceeded to Vienna, where he attempted, unsuccessfully, to bring about a coalition between Austria and Russia. Soon after the re-commencement of hostilities (in May, 1803), he entered the diplomatic service of Russia, in which he spent the remainder of his life. His great object throughout his career was to humble the power of France; and towards this result he rendered efficient service by his various negociations with the allied sovereigns, with whom he entered Paris, March 31, 1814.

Pozzo was now nominated Russian commissioner to the provisional government, and was soon after despatched to England to bring over Louis XVIII. After the return of Bonaparte from Elba, he joined the allied army as Russian commissioner, and was present in that character at the battle of Waterloo, where he received a wound. He then returned to Paris, and resumed his functions of Russian ambassador, and in that capacity signed the Treaty of Paris of Nov. 20, 1815. Soon afterwards the rank of a count and peer of France was conferred upon him. The death of the Emperor Alexander and the accession of Nicholas (31st of March, 1825) did not alter his position; and he received new letters of credence to King Louis Philippe after the Revolution of 1830. He did not revisit St. Petersburg till 1834. On the breaking out of the War of the East in 1835 he was sent on a mission to London; after a stay of a few months he returned to his post at Paris, whence he was sent back to this country as ambassador extraordinary to the King of Great Britain; but he staid only a short time, and again returned to Paris, where he continued till his death, Feb. 15, 1842.

POZZUO'LI, the Roman *Puteoli*, an ancient town of Campania, situated on the eastern shore of the gulf of Baiæ, five miles W. from Naples, from which it is separated by the hill of Posilipo, through which a tunnel was excavated in ancient times. Pozzuoli lies at the foot of the volcanic hill called La Solfatara, and on the western side of it is another volcanic hill called Monte Nuovo, which was thrown up in one night, in September, 1538, on the site of the Lucrine Lake. Puteoli was a flourishing place under the Romans, being resorted to by the wealthy for the sake of its situation and its mineral springs. It is now decayed, but the remains of antiquity attract numerous travellers.

POZZUOLO. [NOVI.]

PRACTICE, a rule of arithmetic, appropriately so termed because it hardly contains any new principle, but depends for its application upon the memory and dexterity which the operator acquires from practice. Thus, in the following simple question, 'How much do forty yards cost at eighteen pence a yard,' some arithmeticians (un-

practised) might find it necessary to multiply 40 by 18 and divide the result by 12, for the number of shillings in the answer; but a practised arithmetician would immediately see that 18*d.* is a shilling and a half, so that 40 shillings must be allowed for the shilling, and 20 shillings for the half shilling, making altogether 60 shillings.

PRADES. [PYRENE'ES ORIENTALES.]

PRÆFECTUS URBI (prefect or warden of the city) was the title of a Roman magistrate. The office was said to have been instituted by Romulus to supply the place of the kings in their absence from Rome. During the republic, the Præfectus Urbi was appointed by the consuls, or the senate when the consuls were absent from the city. In course of time his functions were superseded by those of the Prætor Urbánus, and he became merely a shadow of what he had been. Augustus made a permanent Præfectus Urbi, who had the superintendence of public works, roads, aqueducts, and other things. He had also jurisdiction over slaves and turbulent citizens, and was a kind of head of police. Ultimately he had almost all the power originally possessed by the Prætor Urbanus. ('Dig.' 1, tit. 12, *De Off. Præf. Urbi.*)

PRÆMUNIRE. [LAW, CRIMINAL.]

PRÆNESTE. [PALESTRINA.]

PRÆTOR, a word which apparently contains the same elements as the verb *præire*. The consuls were originally called prætors, but the name prætor was specially appropriated to a magistrate called the Prætor Urbánus, who was first appointed B.C. 365. He was called a colleague of the consuls, and was created with the same auspices. (Liv. vii. 1.) The prætor was at first only chosen from the patricians. In the year B.C. 336 the first plebeian prætor was created. The prætor had six lictors.

The prætor exercised the consular power in the city, while the consuls were at the head of the armies in the field. He also administered justice ('jus in urbe dicebat,' Liv. vi. 42). In B.C. 247, a Prætor Peregrinus was created, who administered justice in matters between citizens and foreigners, and between foreigners (peregrini) only. When the Romans made conquests beyond the limits of Italy, prætors were sent to govern them. Two new prætors were appointed (B.C. 227) for Sicily and Sardinia respectively; and subsequently two others for the two provinces of Spain. The prætors generally spent their year of office in Rome, and then took the government of a province with the title of Proprætor. Sulla increased the number of prætors to eight. The prætor urbánus held the highest rank among the prætors. The number of prætors was increased by C. Julius Cæsar; and finally, under Tiberius, it was fixed at sixteen. Other prætors were subsequently appointed for various purposes, for instance, a prætor who had jurisdiction in trusts (fidei commissa).

The Prætóres Urbánus and Peregrinus had the Jus Edicendi (Gaius i. 2), or publishing of Edicta, which edicta, and more particularly the edicta of the prætor urbanus, were the foundation of that large body of law, called the Jus Honorarium or Prætorium. [EQUITY.]

The prætors also presided in Quæstiones, or judicial inquiries into crimes of certain kinds. The office of prætor existed under the Empire, but with diminished authority after the time of Hadrian or thereabouts. [PRÆFECTUS URBI.]

PRÆTORIANS was, in the time of the Roman republic, the name of a select cohort which attended the person of the prætor or commander of a Roman army. Augustus formed the Prætorians into nine cohorts, and stationed them in Rome as guards to his person. (Sueton. 'Aug.' 49.) These soldiers became under the Empire something like the guards or household troops in the kingdoms of modern Europe. They were commanded by a Præfectus Prætorio. In the frequent revolutions of the empire the prætorians acted a conspicuous part, and often determined the fate of an emperor, and the choice of another.

PRAG (*Prague*) the capital of Bohemia, is situated in 50° 5′ 19″ N. lat., 14° 25′ E. long., 250 miles N.N.W. from Vienna, by railway through Brünn, but only 158 miles in a straight line. The town is built on the banks of the Moldau in a valley and on the slopes of the hills that inclose it. In size and beauty Prag is the third city in Germany, and produces a very striking effect when viewed at a distance, by its commanding situation, the lofty steeples of its numerous churches, and its fine palaces and public buildings. The city consists of four quarters —the old town, which is gloomy and closely built, with very high, old-fashioned houses, and which includes the Jewish quarter: the new town, which surrounds the old town, and has finer and broader streets, spacious squares, lower houses, and a healthy site: the Kleinseite, which stands in a semicircular valley on the left bank of the Moldau, between two hills called the Laurenzberg and the Schlossberg; this quarter is smaller than the old town, but contains many gardens, fine palaces, and lofty houses: and the Hradschin, which is built on the Schlossberg; this is the smallest but the finest part of the city, and contains a great number of magnificent palaces. The town of Wissehrad, which joins the new town, and the village of Smichow, on the left bank of the Moldau, are reckoned as parts of Prague. There is likewise a new suburb called the Karotenenthal. The city is surrounded with fortifications, and has eight gates. The old town and the Kleinseite are connected by a chain bridge recently erected, and by an ancient stone bridge of 16 arches. This last, which was commenced by Charles IV. in 1358, is 619 yards long, 35 feet broad, and 42 feet high; it is adorned with 29 statues and groups of saints, and has an ancient tower at each end. There are in the city 46 Catholic and 2 Protestant churches, 9 synagogues, 15 monasteries, and 68 palaces. The metropolitan church of St. Veit, in the Hradschin quarter, which was commenced in the 10th century, but not completed till 1500, has a steeple 314 feet high, from the top of which there is a magnificent view of the city. This cathedral, in which are the sepulchres of several emperors and kings, of Bohemian princes, and remarkable men, has 12 richly-adorned chapels, and contains paintings of

the 14th century, besides numerous antiquities and relics. The great ornament of the cathedral is the monument of St. Nepomuk, the patron saint of Bohemia. Another remarkable old church is the Theinkirche, which dates from the ninth century, and contains the tomb of the astronomer Tycho Brahe. Many of the more modern churches, which are chiefly in the Italian style, are worthy of attention. Among the palaces, the Imperial palace in the Hradschin is the most remarkable building in the whole city, both for its immense extent and its fine and commanding situation. King Charles X. of France and his family resided for some years in this palace, after their expulsion from France. Other remarkable public buildings are, in the old town, the Collegium Clementinum, built by the Jesuits, in which Joseph II. placed the archiepiscopal seminary; the theatre; the mint; and several palaces, among which is one which belonged to the famous Wallenstein: in the new town, the senate-house, the custom-house, and the military hospital: in the Kleinseite, the arsenal and the government-house: and in the Hradschin, the archbishop's palace.

The Carolinum of Prag is the oldest university in Germany. It was founded in 1348 by Charles IV., on the model of that of Paris. Connected with it are a veterinary school, a school for midwifery, five clinical institutions, zoological and anatomical collections, a botanic garden, a chemical laboratory, and an observatory. There are three gymnasia, several other schools, a polytechnic institution, an academy of the fine arts, a musical conservatory, an Academy of Sciences, and Bohemian National Museum, founded by Count Colowrat, with important collections and libraries. The university library, which consists of 130,000 volumes and 4000 rare MSS. of classical and Slavonian literature, is kept in the Collegium Clementinum; there are besides eight public and several private libraries open for public use. The Imperial Cabinet of Natural History has been greatly increased of late years. The hospitals and charitable institutions for the reception and relief of the poor are numerous and admirably conducted. There are asylums for the blind, for deaf mutes, and for lunatics.

The manufactures consist of cotton, hosiery, silk, leather, hats, gloves, earthenware, jewellery, and plated goods, mathematical and musical instruments, glass, buttons, snuff and tobacco, paper and paper-hangings. There are also breweries, saltpetre-works, and many other industrial establishments. Prag has a very flourishing commerce: the transit trade is considerable, and there are three great annual fairs.

Prag is an ancient city, but the time of its foundation is uncertain. It has suffered frequently and severely by the calamities of war, especially in the religious troubles of the 15th century. In 1620, in the contest between the elector palatine and the emperor for the crown of Bohemia, a battle was fought on the White Hill, two miles from the city, in which the Imperial troops were victorious, and the elector Frederick V., son-in-law of James I. of England, lost the crown. In 1744, the Prussian Frederick II., got possession of the city, but soon afterwards was obliged to evacuate it. In 1757 Frederick again besieged Prag, but the victory of the Austrians at Collin obliged him to retire. On the 29th of May, 1848, the Czechs revolted against Austria and appointed a provisional government. From the 12th to the 17th of June there was desperate fighting between the Czechs and Germans; on the latter day the military under Prince Windischgrätz retired to the Hradschin, from which they commenced to bombard the rest of the town. On the 19th the insurrection was quelled and the ringleaders in custody. The population of Prag is 143,000, of whom 12,000 are Jews.

PRAGMATIC SANCTION is a term which has been used to signify a solemn ordinance or decree of the head or legislature of a state upon weighty matters. The use of it appears to have originated with the Byzantine Empire. It was used in France at an early period of the monarchy. The most celebrated pragmatic sanction is that issued by Charles VII. of France, in 1438, in consequence of the schism in the church between the council of Basel and Pope Eugenius IV. It tended considerably to diminish the power and authority of the court of Rome, and was in fact the foundation of the liberties of the Gallican church.

Another pragmatic sanction, which has acquired an historical celebrity, is that issued by the Emperor Charles VI., in his capacity of king of Bohemia and sovereign of the other hereditary states of the House of Austria. This pragmatic sanction regulated the succession in his family. [HABSBURG, HOUSE OF.]

PRAGUE. [PRAG.]

PRAIRIES. [PLAINS.]

PRAM, CHRISTIAN HENRIKSEN, was born Sept. 4, 1756, in Gulbrandsdalen, in Denmark. He studied law and political economy at the university of Copenhagen; but poetry and literature became his chief pursuits. In 1781 he was appointed to a high situation in the Chamber of Commerce. Shortly afterwards he set up the 'Handelstidende,' or 'Commercial Journal,' which he gave up at the end of five years. In the meantime he had signalised himself by his 'Stœrkodder,' which appeared in 1785. Such a poem was altogether a novelty in Danish literature, and placed its author by the side of Ariosto and Wieland.

Shortly afterwards he commenced, with the assistance of Rahbek, the 'Minerva,' one of the best literary periodicals of its time in Denmark. Among his other services to literature may be reckoned that of having, together with Thaarup, Baggesen, and Höst, established the Scandinavian Literary Society in 1796. He may also be ranked among the Danish dramatists, having, besides his 'Damon and Pythias,' and 'Fingal and Frode,' produced several comedies and some minor pieces for the stage.

On the Chamber of Commerce being united, in 1816, with the Board of West India Affairs, Pram retired from his situation in the former, and

accepted an official appointment in the island of St. Thomas, where he died Nov. 25, 1821.

A collection of his miscellaneous poems and prose works was edited by Rahbek, in 4 vols., 1824-26.

PRANGOS, a genus of plants of the natural family of *Umbelliferæ*, tribe *Smyrneæ*.

The only species known was discovered by the late traveller, Mr. Moorcroft, in Tartary. He considered it as a most important and interesting object of rural economy, and says that it produces fatness in a space of time singularly short; it is also destructive to the *Fasciola hepatica*, or liver fluke, which in Britain, after a wet autumn, destroys same thousands of sheep by the rot. The last-mentioned property, of itself, if it be retained by the plant in Britain, would render it especially valuable to our country. But this, taken along with its highly-nutritious qualities, its vast yield, its easy culture, its great duration, its capability of flourishing on land of the most inferior quality and wholly unadapted to tillage, impart to it a general character of probable utility unrivalled in the history of agricultural productions.

Notwithstanding the highly favourable accounts given by Mr. Moorcroft, it is doubtful whether the Prangos, though highly deserving of trial, would be so valuable as he anticipates in the situations which he points out. Dr. Falconer thinks that its importance has been much over-estimated. But in many barren and bleak situations, with considerable cold in winter, it would no doubt be a valuable acquisition, if the climate of the country be not too moist. Parts of the Cape of Good Hope, New Holland, and Van Diemen's Land seem well suited to it.

PRATINCOLE (*Glareola*, Brisson), a genus of birds allied to the plovers. [PLOVERS.] 'The genus *Glareola*,' says Mr. Gould, in his great work on the 'Birds of Europe,' 'appears to be strictly confined to the old world, no transatlantic example having ever been discovered, nor indeed are we aware of any form in the ornithology of America which at all approaches the present. Three species are all that are as yet discovered. Of these, two (the *G. grallaria* and the *G. lactea*) are peculiar to the eastern provinces of Asia and Africa; the other (*G. torquata*), is spread throughout the warm and temperate regions not only of these continents, but Europe also. Although thus diffused, the Pratincole may be said to be truly a native of the eastern provinces of Europe on the Asiatic borders, and especially Hungary, where wide tracts of morass and flat lands, abounding in lakes both fresh and saline, and traversed by mighty rivers, afford it food and security. "In Hungary," says M. Temminck, "among the immense morasses of the lakes Neusidel and Balaton, I have been in the midst of many hundreds of these birds;" and we might add, that it is no less abundant in Western Tartary. In England it is only an occasional visitor; but in Germany, France, and Italy, it is a bird of periodical occurrence.'

With the long wings and forked tail of the swallow, the Pratincole possesses that rapidity and power of flight for which the bird is so remarkable. It takes its food, which consists of insects, and especially such as frequent marshes and the borders of rivers, while on the wing, darting along in the chase with the rapidity of an arrow; nor is it less distinguishable for celerity on the ground, and often catches its prey as it nimbly runs along. This elegant and graceful bird incubates in the concealment afforded by reeds, osiers, and tall herbage, laying three or four white eggs.

PRATT. [CAMDEN, LORD.]

PRAWN. [SHRIMPS.]

PRAXA'GORAS, a celebrated physician of Cos, belonging to the family of the Asclepiadæ. The titles of several of his works are preserved, but only a few fragments of them remain, together with some of his opinions on medical subjects, recorded by Galen and others. He introduced several improvements into the theory and practice of medicine; for example, he declared that the pulse indicates the variations of the strength of the disease, a discovery which threw great light on the knowledge of diseases. The greater part of the remedies that he employed were taken from the vegetable kingdom, and we are told by Cælius Aurelianus that he was fond of employing emetics. In cases of iliac passion he recommended emetics, as several modern practitioners have also done; and when attended with introsusception, he ventured to open the abdomen, in order to replace the intestine, an operation that has been proposed and executed in modern times. He lived about B.C. 300 (Ol. 120).

PRAXI'TELES, a sculptor of Greece, seems to have lived between 360 and 284 B.C. He was eminent for his works both in bronze and marble, but he seems to have had the highest reputation for his skill in the latter. Amongst those in bronze was a statue of Bacchus; another statue of a satyr was so excellent that it was called by way of distinction Periboétos (the celebrated). He also made a statue of Apollo, called Sauroctonos, or the lizard-killer. Two statues of women are recorded by Pliny; one of them represented a matron weeping, the other a courtesan laughing. Of these works, and several others in the same material, the only record that remains is an undoubtedly ancient copy, in marble, of the Apollo Sauroctonos, justly considered one of the greatest treasures of the Vatican. Among the works in marble by Praxiteles, the famous Venus of Cnidus must undoubtedly be placed in the first rank. The representation of a figure of Venus on the coins of Cnidus affords unquestionable authority at least for the action and general composition of the far-famed statue. The original work fell a prey to the flames, at Constantinople, in the fifth century.

The style of the school of which Praxiteles may be considered the founder, was softness, delicacy, and high finish.

Praxiteles had two sons, Timarchus and Cephisódotus, or Cephisodótus, both of whom were artists. Pliny says of the latter, 'Praxitelis filius Cephisodotus rei et artis heres fuit.'

PRAYER, a term in theology, used to desig-

nate the intercourse passing between human minds and the divine. Language appears not to be necessary to complete the idea which the word represents, since we speak of mental prayer, which is thought directed heaven-wise in adoration or in entreaty, without the sentiment of the mind being embodied in words or finding expression by the lips. But its far more common use is to express this kind of intercourse when the sentiment of the mind is embodied in language.

From examples in the Scriptures, and those of various good men in ancient times, Christian divines have deduced certain principles respecting prayer. They have in fact raised a kind of system of prayer: dividing and subdividing the several branches of it. Of these it will be sufficient to say that a prayer, or a body of words expressive of the intercourse, should contain—(1) Expressions of adoration and admiration of the Mighty Being who is the object of address. (2) Expressions of our own unworthiness to receive more blessings than he has already seen proper to bestow upon us. (3) Then comes the supplicatory part, in which general or particular blessings are besought, suitable either to the general condition of the person praying, or to the particular circumstances of the moment. (4) Intercession for others. (5) Lastly comes thanksgiving.

Liturgies are of the nature of printed collections of prayers. They are guides to the mode in which the prayers of many assembled in Christian congregations shall be offered. The Book of Common Prayer contains the Liturgy of the English Church as appointed by authority.

PREBEND (*prebenda*, from *præbeo*, a Low Latin word signifying provision or provender), the portion which the member of a cathedral or collegiate church, called a Prebendary, received in right of his place for his maintenance. It was named from the place whence the profit proceeded, which was either from some temporal lands or church preferment attached to that church, or some other church whose revenues were appropriated towards the maintenance of the member of the cathedral or collegiate church. [CANON.]

PREBENDARY. [PREBEND.]

PRECEDENCE, 'a going before,' which explanation explains the nature of the thing. On all great and public occasions when persons come together, it is convenient to have some rule which shall determine who shall walk first or sit in the chief place, and so forth. A positive rule prevents disputes and contributes to order. In England the members of the College of Arms, who are the council of the Earl-Marshal of England, are usually referred to in questions of precedence; and they have the arrangement of public processions, at royal marriages, funerals, coronations, and the like, when questions of precedence come to be considered.

There are tables of precedence in many books, and especially in those called Peerages.

PRECESSION AND NUTATION, the abbreviated way of expressing the Precession of the Equinoxes and the Nutation of the Earth's Axis.

These phenomena should always be considered in connection with the rotation of the earth, of which they really form a part; that is to say, diurnal rotation, precession, and nutation, are the motions of the earth about its centre, independently of the motion of that centre along its orbit round the sun. It will assist our comprehension of the subject to suppose the earth's centre a fixed point, the relative motions of the heavenly bodies being adjusted accordingly.

The rotation of the earth round its axis is visible from hour to hour by the change of place in the stars: the precession and nutation are motions of too slow a nature to be rendered visible, and indeed could hardly be made so unless the ecliptic and equator were visible circles. If such were the case, and if the motions were large enough, the equinoxes, or intersections of the equator and ecliptic, would appear to change place, the equator moving slowly round the ecliptic with a retrograde motion, that is, contrary to the annual course of the sun. The equinoxes would appear to move with a variable motion, sometimes a little faster and sometimes a little slower than the mean motion. At the same time the equator would appear to swing backwards and forwards to and from the ecliptic, turning upon the equinoxes as pivots. Of these motions the average motion of the equinoxes upon the ecliptic is the Precession; the alternate acceleration and retardation is one part of the Nutation; and the alternate increase and diminution of the angle contained between the two is the other part. It is however common to call the acceleration and retardation of the motion of the equinoxes by the name of the Equation of the Equinoxes, and to reserve the name of Nutation for the motion of the pole which corresponds to it.

About two thousand years ago the equinox was twenty-eight degrees more advanced among the signs, and was near the beginning of the constellation Aries. It was about this time that the precession of the equinoxes was discovered by Hipparchus, and since that time the vernal equinox has preserved the title which it properly held at the time when its motion was discovered, namely, the first point of Aries. Certain astronomical fictitious constellations have been made to move with the equinox, at least until lately. Counting from the equinox, the first thirty degrees of the ecliptic have been always called Aries, the second thirty Taurus, and so on. Thus when an astronomer of the middle ages asserts the longitude of a star to be $\simeq 18° 22'$, he means that it is in 18° 22′ of the astronomical Libra, a constellation supposed to begin at $6 \times 30°$ or 180° distance from the vernal equinox. An astronomer of our day would say that the star's longitude was 198° 22′.

On looking at the motion of the equator arising from precession and nutation, we see that it precisely resembles in character some of the alterations which take place in a planet's orbit, the precession answering to the regression of the nodes, the equation of the equinoxes to the variation of that regression, and the remaining part of the nutation, or the variation of the obliquity, to the variation of the inclination to the ecliptic. It was soon seen by Newton that, on the supposition

of the mutual attraction of all the particles of matter, the action of the heavenly bodies on the protuberant parts of the earth must produce exactly that sort of effect on the motion of the equator which the disturbing force of the sun, for instance, produces on the moon.

PREDESTINATION is the decree of God by which he has from all eternity predetermined whatsoever shall come to pass. That the whole universe is governed by a fixed plan, and that all events are tending to the accomplishment of certain objects, is a necessary result of the infinite foreknowledge of God, and of his character as the being who 'created all things, and for whose pleasure they both are and were created.' ('Rev.' iv. 11.)

The greatest difficulty in this doctrine is the supposition, maintained equally by Calvin and the Anti-Calvinists, that election and reprobation are inseparable: that if God has destined some to eternal happiness, it follows, as a necessary consequence, that he has destined the rest of our race to eternal damnation. This consequence is denied by the modern Calvinists. It should be carefully observed that the doctrine of election involves no idea of any who are seeking after salvation being denied, repulsed, or hindered.

Another objection to the doctrine of predestination is, that it makes evil to be the result of a divine decree. This again the modern Calvinists deny. To the objection that predestination is inconsistent with free will, it is answered, that the actions, even of a free will, must be determined by some cause, either efficient or deficient; and that God foreknows the deficiencies which are the causes of all the evil determinations of the human will, while all its good determinations proceed from himself, as the source of all good.

PREDICABLES. The term predicable (*κατηγορικὸν*, *prædicabile*) is applied in logic to general names, considered as capable of being the predicates of propositions. [ORGANON.] The classes of predicables usually recognised by logicians are five, viz. 1, Genus; 2, Species; 3, Differentia; 4, Proprium; 5, Accidens; which Latin names are translated from the Greek, 1, *γένος*; 2, *εἶδος*; 3, *διαφορὰ*; 4, *ἴδιον*; 5, *συμβεβηκὸς*.

The five-fold classification of the predicables does not occur in Aristotle's 'Organon,' or any other of his extant writings; and it probably did not occur in any of his lost writings. The word *γένος* is often used by Aristotle to signify a class: we do not however recollect any instance of the use of the word *εἶδος* in the sense of a logical species in his writings. In his 'Nicomachean Ethics,' b. i., c. 4, he applies the word *εἶδος* to the ideas (or supposed archetypal forms of general notions) which were imagined by Plato. The word *συμβεβηκὸς* (or *κατὰ συμβεβηκὸς*) is often used by Aristotle to signify that which is contingent or accidental, in opposition to that which is necessary (*ἀναγκαῖον*).

The earliest work in which the received classification of the predicables occurs, is an 'Introduction to Aristotle's Categories,' written by Porphyrus of Tyre. From this treatise the classification and explanation of the predicables have passed into the various treatises of the Aristotelian logic, and have been repeated, with some variations, to the present day.

PREDICAMENTS. [CATEGORIES.]

PRE'FET, PREFECT. [DEPARTMENT.]

PREHNITE, a mineral which occurs both crystallised and massive. It is, as a crystal, whitish, hard, and translucent. It consists chiefly of silica, alumina, and lime.

PRELATE (etymologically from *præ* and *latus*), a person *preferred* or advanced before another, but it is confined to a particular species of preferment or advancement, namely, that amongst the clergy; and it is applied to those only amongst them who have attained the very highest dignity, that of bishop or archbishop, to which we may add *patriarch*, in such churches as have an officer so denominated. The word prelate has however in ancient times been applied to simple priests, members of the clerical body in general.

PRELUDE, a brief introduction to a piece of music.

PREMIUM. [INSURANCE.]

PREMNA, a genus of plants of the natural family of *Verbenaceæ*. The species consist of shrubs and small trees, which are indigenous in Asia and New Holland.

The majority of the species are remarkable for the fetid odour of their leaves, though those of *P. cordifolia* are somewhat fragrant, and those of *P. esculenta* are employed as diet by the natives of Chittagong. *P. integrifolia* has roots of a burning taste, with leaves of a hircine odour. The leaves, applied to the head, are said to cure headache, and a decoction of the roots is employed as a stimulant in fevers, flatulence, &c. *P. latifolia* has wood of a white colour and firm texture, employed for various economical purposes, in which it agrees in character with the Teak Tree, *Gmelina arborea*, and others which belong to the same natural family.

PREMONSTRATENSIAN ORDER. The Premonstratensians were canons who lived according to the rule of St. Austin, as reformed by St. Norbert, afterwards archbishop of Magdeburg, who set up this regulation about A.D. 1120, at Premonstratum, in the diocese of Laon in Picardy, a place so called because pointed out, as it was said, by the blessed Virgin to be the head of this reformed order.

These canons were also called *White Canons* from their habit, which was a white cassock with a rochet over it, a long white cloak, and white caps. They were brought into England shortly after A.D. 1140, and settled first at Newhouse in Lincolnshire. They had in England a conservator of their privileges, but were nevertheless often visited by their superiors of Premonstre, who raised great contributions out of them, as the generals or foreign heads of the Cluniacs or Cistercians also did from their order, till restrained from it by the parliament of Carlisle, in the last year of Edward I., A.D. 1307. Tanner reckoned about thirty-five houses of this order in England.

PREPOSITIONS are certain words which ex-

press a relation between different things. Prepositions are so called because they are *preposed* or prefixed to the words with which they are connected; but the name is an unfortunate one, since they are sometimes *postponed* or placed after such words, as in *wherewith, wherein, wherefrom, thereby*, &c. In languages like our own, which have hardly any inflections, the relation which one thing bears to another can only be expressed by means of prepositions; but in languages which possess inflections, like the Latin and Greek, the same relation may frequently be expressed by means of cases, which are in fact prepositions placed at the end of nouns. Thus, in the expression 'the son *of* the king,' we express the relation between 'son' and 'king' by the proposition 'of;' while in Latin the same relation is expressed by *is* placed after the Latin word for king, *filius reg-is*. But as the meaning of these case-endings was not always definite enough, it became customary to mark the relation more precisely by prefixing certain words, as in our own language. The case-endings however were not dropped; so that in such expressions as *ad urb-em, cum reg-e, pro reg-e*, the noun may be said to have two words to mark relation, one placed before and the other after it.

The number of prepositions differs, as might be expected, in different languages. The Greek grammarians admit only eighteen, the Latin about fifty. In English the following words are usually considered as prepositions:—Above; about; after; against; among, amongst; amid, amidst; around, round; at; between, betwixt; beyond; before; behind; beneath; below; beside; by; down; for; from; in, into; near, nigh; of; off; over; on, upon; since; through, throughout; till, until; to, unto; toward, towards; under, underneath; up; with; within; without.

Besides these prepositions, there are in English, Latin, Greek, and many other languages, certain particles never found singly, or uncompounded, and which are therefore called inseparable prepositions, as in English *be, for, fore, mis*, &c., which occur in such words as *be-stir, be-speak, for-bid, for-sake; fore-see, fore-know; mis-take, mis-deed*, &c.

PREROGATIVE, a term derived from the Latin *prærogativa*, though the modern sense of the word bears little resemblance to its original meaning. As a political term it now signifies all the powers that belong to the crown of Great Britain and Ireland, and are exercised by the king or queen regnant, either personally or by delegation to others. [KING; PARLIAMENT.]

PREROGATIVE COURT. [ECCLESIASTICAL COURTS.]

PRESBURG, *Posonium* (in Hungarian, *Posony*), once the capital of Hungary, is situated on the north bank of the Danube, 33 miles in a straight line E. from Vienna, in 48° 8′ N. lat., 17° 10′ 45″ E. long., and has 38,000 inhabitants. It is built on a hill of moderate height, commanding a fine view over an extensive plain watered by the Danube, which is here crossed by a bridge of boats 365 paces in length. The fortifications have been demolished, and the suburbs are no longer separated from the city. The town seems to have existed in the time of the Romans. In 1446, Ofen having fallen into the hands of the Turks, Presburg was declared the capital of Hungary, and the diets were held there till lately. In 1784, Joseph II. decided that the viceroy and palatine, with the high officers of government, should reside at Ofen, as a more central situation. The emperor is however *still* crowned here as king of Hungary. Presburg, which was formerly not only the handsomest, but the most important and most populous city in Hungary, is now far surpassed in all respects by Pesth and Ofen. The trade of the city is considerable in consequence of its vicinity to Vienna, with which it is connected by railroad, and of the navigation of the Danube by steamers. The principal buildings are—the cathedral, in which the kings of Hungary are crowned; the county-hall, the ancient senate-house, the archiepiscopal palace, and the theatre. Among the public institutions are several academies, a royal model school, an hospital, and a library of 50,000 volumes, the gift of Count Appony to the town. On a hill out of the city, 439 feet above the level of the Danube, are the remains of the royal palace, which was burnt down in 1811, and has not been restored. It was in this palace that the Hungarians uttered the famous outburst of loyalty towards their *King*, Maria Theresa. There are various manufactures of woollens, silk, tobacco, snuff, oil, rosoglio, and leather. A treaty was signed at Presburg in 1805, after the battle of Austerlitz, by which Venice was ceded to France.

PRESBYTERIANS (πρεσβύτερος, an elder) are professors of the Christian religion who believe that there is no order in the church, as established by Christ and his Apostles, superior to that of Presbyters; that all ministers, being ambassadors of Christ, are equal by commission; that Presbyter or Elder, and Bishop, are only different names for the same person; and that Deacons are laymen whose office is chiefly to take care of the poor.

The most noted Presbyterian Church of the present day is that of Scotland, which is called the Kirk. It was founded by John Knox about 1560, and after various changes was finally re-established at the Revolution of 1688.

The first Presbyterian congregation in England was formed at Wandsworth, near London, in 1572. In 1649 the Presbyterian discipline was sanctioned by Parliament, and the Established Church was Presbyterian till Episcopacy was restored with the restoration of Charles II. in 1660.

There are still congregations in England called Presbyterian; but in both doctrine and discipline they differ materially from the Scottish Presbyterians.

PRESCOT. [LANCASHIRE.]

PRESCRIPTION. 'No customs is to bee allowed, but such custome as hath been used by title of prescription, that is to say, from time out of mind. But divers opinions have been of time out of mind, &c., and of title of prescription, which is all one in the law.' (Litt., s. 170.) According to this passage, 'time out of mind,' and 'pre-

scription,' which are the same thing in law, are essential to custom: another essential to custom is usage. But there is a claim or title which is specially called prescription, and which is like custom so far as it has the inseparable incidents of time and usage; but it differs from custom in the manner in which it is pleaded, which difference shows the difference of the right. This claim is called prescription, because the plaintiff or defendant who makes it 'prescribeth that,' &c.; stating after the word 'prescribeth,' the nature of his claim.

An example of a prescription is contained in Co. Litt., 114. The claim by prescription is properly a claim of a determinate person: the claim by custom, as opposed to prescription, is local, and applies to a certain place, and to many persons, and perhaps, it may be added, to an indeterminate number, as the inhabitants of a parish. The following definition of prescription appears to be both sufficiently comprehensive and exact:—'Prescription is when a man claimeth anything for that he, his ancestors, or predecessors, or they whose estate he hath, have had or used anything all the time whereof no memory is to the contrary.' ('T. de la Ley.')

Recent acts have made some alterations as to prescription, and limited the time within which actions can be brought or suits instituted relating to real property. The 3 & 4 Wm. IV., c. 27, applies to everything of a corporeal nature, which is land in the sense in which land is interpreted in that act; but it only applies to three kinds of property of an incorporeal nature, which are advowsons, annuities, and rents. The 2 & 3 Wm. IV., c. 100, applies only to cases of modus and exemption from tithes. The 2 & 3 Wm. IV., c. 71, which is entitled 'An Act for Shortening the Time of Prescription in certain cases,' applies (s. 1) to 'claims which may be lawfully made at the common law by custom, prescription, or grant, to any right of common or other profit or benefit to be taken from or upon any land, &c., except such matters and things as are therein specially provided for, and except tithes, rents, and services;' (s. 2) 'to any way or other easement, or to any watercourse, or the use of any water,' &c.; and (s. 3) to the use of light. The provisions of the act cannot be stated much more briefly than in the terms of the act.

The acts here enumerated do not apply to a claim 'of a manor, a court-leet, a liberty, separate jurisdiction, treasure trove, wreck, waifs, and other forfeitures, fair, market, fishery, toll, park, forest, chace, or any privilege legally known as a franchise, as well as anything pertaining to those rights which come under the description of dignities or offices.'

The term prescription is derived from the Roman law, but the original meaning of the term in the Roman law is different.

PRESCRIPTION in the law of Scotland supplies the place of the Statute of Limitations in the law of England. It not only protects individuals from adverse proceedings which other parties might have conducted if the lapse of time had not taken place, but it in some instances creates a positive title to property. The prescription by which a right of property can be established is that of forty years—a period probably borrowed from the 'præscriptio quadraginta annorum' of the Romans. Whatever adverse right is not cut off by the other special prescriptions of shorter periods, is destroyed by the *long* prescription. It may be said generally to preclude the right of exacting performance of any claim, as to which no judicial attempt has been made to exact performance for forty years from the time when it was exigible. To create a title to real property, the long prescription must be both positive and negative. The party holding the property must, by himself or those through whom he holds, have been forty years in unchallenged possession of the property on a title ostensibly valid—this is called positive prescription; and the claimant and those whom he represents must have been forty years without an ostensible title, and must, by not judicially attacking it, have tacitly acquiesced in the possessor's title—this is called negative prescription.

The other and shorter prescriptions cut off particular descriptions of claims or methods of supporting them. By the vicennial or twenty years' prescription, holograph writings, not attested with the usual solemnities of Scottish writs, cease to 'bear faith in judgment.' An obligation of cautionary or suretyship is limited to seven years. Bills of exchange and promissory notes cease to have force after six years; but the debts they represent, if they do represent debts, may be proved by other means. The quinquennial prescription cuts off all right of action, after the lapse of five years, on bargains proveable by witnesses. It also protects agricultural tenants from a demand for rent after they have been five years removed from the land to which the demand applies. The triennial, or three years' prescription, is very important. It cuts off claims on account for goods or services, the three years running from the date of the last item of the account; and also claims for wages, each year's wages running a separate prescription, and ceasing to be exigible, if not pursued for, in the lapse of three years after the time when it became due.

PRESENTATION. [Benefice.]

PRESS. [Printing-Press; Screw-Press.]

PRESS, BRAMAH'S. [Hydraulics.]

PRESS, CENSORSHIP OF. [Censorship of the Press.]

PRESSURE. To explain the use of this term in mechanics, we must remember its previous and common use. When we attempt to move matter, or when we sustain a weight, the effect is accompanied by a perception which is called pressure. The sense of touch is nothing but this perception; contact without pressure is not touch, and there are even weights too small to give the sense of touch. A small feather supported on the open palm is not felt, though it would fall to the ground if the palm were removed.

The word pressure is soon indissolubly connected with the notion of motion caused or prevented. Let the obstacle which is pressed suddenly break, and the hand which pressed must follow, unless

the person who presses it can take an instantaneous warning to cease his effort. Hence, whenever we see motion caused, prevented, or altered, we are apt to carry with us the notion that pressure is exerted. The weight in the scale of a balance is said to press the scale; not that we suppose the scale to have muscles to be acted upon, and nerves to carry news of the action to a living brain, but that we see a counteraction of the known tendency of the weight to fall, and know that if the counteraction were the work of a human agent, that agent would be conscious of the perception of pressure. Hence everything fitted to produce the sensation of pressure, such as a weight, the elasticity of a spring, &c., comes to be called a pressure, and the word loses its meaning of a perception conveyed, and takes that of an agent proper to produce that perception if the human being were situated so as to receive it.

This consideration is not unimportant, for a latent confusion between pressure as a perception, and pressure as a cause proper to produce that perception, has prevented many from a clear understanding of the Newtonian doctrine of gravitation, has caused some to reject it altogether, and has made one or two write books against it.

Pressure can only produce an effect in time; an instantaneous alteration of velocity being mechanically absurd. But if a pressure produce its whole effect in an imperceptible time, there is all the appearance of an instantaneous destruction or creation of velocity. Suppose a hammer, for instance, to strike an anvil with a velocity of 20 feet in a second. The instant the contact begins both hammer and anvil begin to be compressed, and the compression begins at the rate of 20 feet a second. But the resistance to compression is enormous, and is a pressure which, though it takes time to destroy any velocity, yet will destroy a velocity of 20 feet a second in a very small fraction of a second. The moment the velocity is all destroyed the effort of the anvil and hammer (both of which are compressed) endeavouring to restore themselves, the continuation in fact of the pressure which destroyed the velocity, will give a velocity to the hammer in a contrary direction, or the hammer will rebound, as it is well known to do.

PRESTER JOAO, 'the Priest John,' was the name given in the middle ages to a supposed Christian sovereign who was said to live somewhere in the interior of Asia. This report appears to have originated with the Nestorians of Mesopotamia, whose missionaries penetrated into Persia, India, and Tartary, and were protected by some of the sovereigns of those regions. [NESTORIANS.]

The existence of such a sovereign continued to be believed in Europe till the end of the 5th century, when the Portuguese, having reached India, set about looking for Prestor John in that country, but without success, though they found a community of Nestorian Christians on the Coromandel coast. At last Pedro Covilham happened to hear that there was a Christian prince in the country of the Abessines (Abyssinia), not far from the Red Sea, and he concluded that this must be the true Prester John. He accordingly went thither, and penetrated to the court of the king of Habbesh, who was then in Shoa. It was found however that the 'negus' or king of Habbesh had never assumed the name of Prester John.

PRESTON, a municipal borough and parliamentary borough, in Lancashire, on the northern bank of the Ribble, about 15 miles above its mouth, in 53° 46′ N. lat., 2° 42′ W. long.; 210 miles N.N.W. from London by the North Western Railway, and 20 miles S.E. from Fleetwood by the Preston and Wyre Railway. Preston has also railway communications with Liverpool, Manchester, and all the large towns of the north.

The town is on an eminence, and consists of a number of streets irregularly laid out, but well lighted and paved. It is the seat of a considerable cotton manufacture. There are two bridges over the Ribble: Walton bridge, on the road to Chorley, and Penwortham bridge, on the road to Liverpool. The parish church, St. John's, erected 1814, has a square embattled tower, with clustered pinnacles. St. George's, built above a century ago, is a large brick building. Trinity Church was built in 1814. St. Paul's and St. Peter's are both gothic churches of recent date. There are a custom house, a town-hall (a neat building of brick), a county sessions-house and house of correction, a neat theatre, a handsome suite of assembly rooms, warm and cold baths, a dispensary, and a fever hospital.

The staple trade of Preston, till within the last half century, was in linens, but this trade has given place to that of cotton, which is now manufactured very extensively. There are several iron foundries, chiefly for making the machinery used in the cotton manufactures. Some leather is made. The Ribble is navigable at spring-tides for vessels of 150 tons; but it is ill adapted for trade. The number of sailing vessels belonging to the port on Dec. 31, 1847 was—Under 50 tons, 88 (aggregate burthen 3160 tons); above 50 tons, 31 (aggregate burthen 2978 tons). There were 14 steam vessels. The Lancaster canal passes on the west side of the town, and connects it with the great canal system of the manufacturing districts.

The borough is divided into 6 wards, and is governed by 12 aldermen and 36 councillors. The population of the municipal borough in 1841 was 50,131. The parliamentary borough returns two members: population 50,332.

PRESTON, THOMAS, was a master of arts of Cambridge and a fellow of King's College; and he was afterwards created a doctor of law and master of Trinity Hall. In 1564 he acted with great applause before Queen Elizabeth, in Rightwise's Latin play of Dido. About the same time he wrote 'A Lamentable Tragedy, mixed full of pleasant mirth, containing the life of Cambises, king of Persia, &c., and last of all his odious death by God's justice appointed: done in such order as followeth.' This rude and imperfect old piece is curious from its early place in the history of the English drama; but its tumidity made it a

fair mark for Falstaff, in proposing to be tragical 'in King Cambyses' vein.' The play is printed, from the undated black letter edition, in Hawkins's 'Origin of the English Drama,' 1773.

PRESUMPTION. A presumption is variously defined. The following is a definition :—'A presumption may be defined to be a belief as to the existence of a fact not actually known, arising from its necessary or usual connection with others which are known.' (Starkie, 'Law of Evidence,' i. 23.) In another passage (p. 1234) the same definition is given in substance, with the word 'inference' substituted for 'belief.'

A fact may be proved by the immediate knowledge of the witnesses to it, which is called direct evidence. If it cannot be so proved, some other fact may generally be proved by direct evidence, from which the fact in question may often be inferred. If such other fact can be proved, and the existence of the fact in question can be inferred, such inference is a presumption. The inference may be either strictly logical or necessary, or it may be only probable, that is, the fact inferred may be true or it may not be true. If we cannot infer from the fact proved that the fact in question may be true, there can be no presumption at all as to such last fact. In all cases, then, in order to establish a presumption, there must necessarily be an inference from a fact or facts; but the inference may be either necessary or probable. If necessary, it cannot, by the supposition, be disproved; if probable, it may either be disproved by evidence, or it may not be possible to disprove it for want of evidence, and yet the inference will still only be probable.

Presumptions which are necessary can hardly ever be considered as not conclusive in any system of law. Presumptions which are only probable may by positive law be made as conclusive as necessary presumptions, that is, it may not be permitted to disprove them when they could be disproved; or where such disproving evidence is wanted, and yet the inference is only probable, positive law may give it the same conclusive force as a necessary presumption.

A presumption, when established, that is, a fact, when presumed, is legally the same as a fact proved in such manner as the particular system of law requires such fact to be proved. If then the law annexes any legal consequence to a given fact when proved, it annexes the same to it when the fact is legally presumed. It is only by virtue of legal consequences being annexed to facts that they become objects of jurisprudence. The establishment then of a presumption, in a legal sense, is only the establishment of a fact to which certain legal consequences are annexed.

PREVESA, a town in European Turkey, on the north side of the entrance of the Gulf of Arta, in 38° 57′ N. lat., 20° 49′ E. long. The origin of Prevesa is not known. Its situation made it an object of desire to the Venetians, who obtained possession of it in 1684. In 1798 it came with the Ionian Islands into the hands of the French by virtue of the treaty of Campo Formio. War having broken out between France and the Porte, the town was taken from the French by an Albanian force under Ali Pacha's son Mouctar. The oppressive government of Ali quickly reduced the population, which at this time was about 10,000, and annihilated the commerce of the town. The streets were deserted, and most of the houses and all the churches except one were destroyed. Ali made Prevesa his chief naval station, fortified the town with new works, and adorned it by the finest palace or seraglio in his dominions, built at the entrance of the bay. Some new and handsome houses were built by the Turks and Albanians who settled here, but Prevesa has never recovered its prosperity.

The population is said to be about 4000. The chief articles of export are wheat and maize, timber, oil, tobacco, cotton, and wool; capotes, or Albanian cloaks, are also important articles of trade. The imports are coffee, sugar, common cloth, velvet, iron goods, fire-arms, &c.

PRICE. Political economists speak both of natural or necessary price and market price. The natural price of commodities, it is said, is as a general rule determined by the cost of production, or, in other words, by the amount of labour expended on them; and consequently equal quantities of labour will exchange for equal quantities of labour. The mode of ascertaining what are equal amounts of labour is not and cannot be clearly explained; and it is admitted that the equality of labour is not to be measured by time only, but the kind of labour must be taken into account. This natural price is the same thing which is meant by the expression Real Value, which is said to be dependent solely on the quantity of labour necessary for the production of a thing. The market price or exchangeable value is that value in exchange which is actually got for anything, which will not always be the same as the price called natural or real; but the exchangeable value, it is said, never varies materially either above or below the real value. Accordingly the cost of production is considered to be that which regulates market price, when industry is not restricted; but this doctrine is sometimes announced with a limitation: the things produced must be such as can be indefinitely increased in quantity by the application of fresh capital and labour to their production.

According to this doctrine labour is the measure of real value, and real value never varies much from exchangeable value. But labour itself requires a representative, something that shall measure one kind of labour compared with another; and gold and silver are commonly used for this purpose. But gold and silver also vary both in real value, as above explained, and in exchangeable value: the result of all which is, that there is no measure of the exchangeable value of a thing other than the amount of gold or silver or anything else that can be got for it. Things must be exchanged either by simple barter, without any price being fixed on the things exchanged; or by an exchange of commodities, in which exchange the commodities have a money price fixed upon them; or by giving gold and silver, or other things which are current as coin, for commodities.

Labour is the sole source of wealth and of all

exchangeable value, and the cost of production is an essential element in the exchangeable value of all commodities. The cost of production is the regulator of selling prices. In the actual operation of exchanges, it is the efficient demand, the will and the power to purchase, combined with the supply, that really determine the selling price of all things.

There are two ways of viewing the subject of exchangeable value. The mode which some economists adopt is to trace it from the operations of a rude and savage state to the complicated conditions of modern society—a process something like that of tracing government from a supposed state of nature to the actual condition of existing governments. There is nothing gained by this mode of viewing the subject, and it involves the introduction of certain hypotheses not necessary to the investigation. The other method is to view societies as they exist, and to analyse the complicated movements in which consist their activity and energy. In this actual condition we know on what terms buyers and sellers meet in the market. Each brings to market what he does not want, and he gets what he can. Each knows that the other expects and desires to make a profit by the exchange, and that if there is not profit on both sides, or what both parties consider to be profit, the exchange will not continue. Each therefore has his own measure of that which he would give in exchange, and he is moved to produce what he offers in exchange by the general market price of that which he gives in exchange. His power to produce and his motive to produce are therefore regulated at each moment by something which is anterior to his production and which regulates his production. The exchangeable value of a thing, therefore, as determined by the selling price at a given time or by the average of selling prices for a certain period, is in practice the real regulator of the labour of him who produces for sale. A man who ventures on the production of a new article can only guess whether it will exchange for such a value as will give him a profit: and he is often deceived. If he can produce a thing that is already in demand cheaper than it has been hitherto produced, he has a certainty of a profit, and a larger profit on each single article than before, unless there are competitors in the market. Competition will reduce his rate of profit. Practically, the selling prices of any given time, or the average of such prices for a given period, regulate the operations of producers both as to the quality and the amount of the articles which they produce. The producer has always regard to the cost of that which he produces and the probable price that he can get for it. The price that he can get cannot determine the cost of his production, nor can the cost of his production determine the price that he can get for it; but he does produce with reference to a certain price which he expects to get. The consumer who buys his commodity never considers the cost of its production. He simply avails himself of the competition of the sellers to get it at the lowest market price: if it is an article of necessity, he must buy so long as he has the means of buying; if it is an article of luxury, he will often do without it, if the amount of the supply does not allow him to have it on his own terms; and he leaves the producers to make the best of their wares.

The difficulty of attaining clear conceptions on all such subjects as price is inseparable from the complicated nature of the elements which enter into them. The fault of most economical writers consists in the absoluteness of the principles which they lay down, for there is perhaps no principle applicable to the operations of industry which is susceptible of being laid down in absolute, unqualified terms. Another obvious fault in some economical writers consists in not analysing the operations of society as they actually are, but in building up their theories almost entirely on certain axioms.

Adam Smith's opinions on Price are contained in his seventh chapter; upon which see the notes in the edition of Smith, published by Knight & Co., 1840.

PRICE, RICHARD, was born at Tynton in Glamorganshire, Feb. 23, 1723. His father Rice Price, a rigid and intolerant Calvinistic minister, left his entire property to one son, leaving his widow and six other children in straightened circumstances. Richard, who was one of the six, and who was sixteen at his father's death, had been educated by some dissenting clergymen, but had angered his father by his religious opinions. In his eighteenth year he went to London, and obtained admission to a dissenting academy. In 1743 he engaged himself as chaplain and companion to the family of Mr. Streathfield of Stoke Newington. There he resided thirteen years, after which he received the appointment of morning preacher at Newington Green Chapel. He married in 1757, having previously inherited some property. The year following he published his 'Review of the principal Questions and Difficulties in Morals,' 8vo., Lond., 1758. In 1769 appeared his 'Treatise on Reversionary Payments;' and in the same year the University of Glasgow conferred on him the degree of D.D. In 1776 his 'Observations on Civil Liberty, and the Justice and Policy of the War with America,' excited much attention: from some of his countrymen he received addresses of congratulation, and from the American Congress very liberal offers of public employment in that country, if he would become a citizen of the United States. These offers however he declined.

Dr. Price died in London in 1791. For further information the reader is referred to the 'Memoirs of the Life of Richard Price, D.D., by William Morgan, F.R.S.,' London, 1815, 8vo. The works of Dr. Price not already referred to are very numerous: they are religious, politico-economical, and mathematical. Throughout his writings he shows himself an earnest reformer and lover of liberty.

PRIDEAUX, JOHN, was born at Stowford, in Devonshire, Sep. 17, 1578. His family were poor, but a lady of the parish maintained him at school till he had acquired a knowledge of Latin, and he was admitted a poor scholar at Exeter College, Oxford, 1596. He was elected proba-

tioner fellow of his college in 1602, being then B.A. In the following year he received holy orders, and was elected rector of his college in 1612. In 1615 he succeeded Dr. Robert Abbot, then promoted to the see of Salisbury, as Regius Professor of Divinity, canon of Christ Church, and rector of Ewelme. He afterwards held the office of vice-chancellor. In 1641 he was consecrated *bishop of* Worcester, but on *account of* his adherence to the king he became greatly impoverished. He died of a fever, at Bredon in Worcestershire, July 12, 1650.

The works of Bishop Prideaux were numerous, and mostly written in Latin, upon grammar, logic, theology, and other subjects.

PRIDEAUX, HUMPHREY, was born at Padstow in Cornwall, May 3, 1648, of an ancient family. He was sent to Westminster; and was elected to Christ Church, Oxford, where he became a student in 1668; B.A. in 1672; and M.A. in 1676. In 1676 he published, by appointment of the University, the inscriptions of the Arundel Marbles, with a commentary, in one vol. folio, under the title of 'Marmora Oxoniensia ex Arundellianis, Seldenianis, aliisque conflata, cum perpetuo Commentario.' In 1679 Prideaux was presented by lord-chancellor Finch to the rectory of St. Clement's, Oxford, and in the same year was appointed Dr. Busby's Hebrew lecturer at Christ Church. In 1681 he was installed prebendary of Norwich, in the following year was made B.D., and D.D. in 1686. He then exchanged the living he held in Oxfordshire for that of Saham in Norfolk, and went to settle upon his prebend in Norwich. Here he became engaged in controversy with the Roman Catholics, and published 'The Validity of the Orders of the Church of England made out.' He had previously distinguished himself in classical literature; and he took an active part in resisting the arbitrary attempts of James II. against the interests of the established church. In 1688 he was collated to the archdeaconry of Suffolk. In 1694 he resigned his living at Saham, and in 1696 he was instituted to the vicarage of Trowse, near Norwich. He published in 1697 his 'Life of Mahomet,' of which three editions were sold off the first year. In 1702 Dr. Prideaux was made dean of Norwich. In 1707 he published 'Directions to Churchwardens,' a work which has often been reprinted. In 1710 appeared his work upon 'Tythes,' 1 vol. 8vo. Ill health now compelled him to resign the vicarage of Trowse, but he still pursued his private studies, and in 1715 he brought out the first part of his principal work, the 'Connection of the History of the Old and New Testament,' and the second part in 1717, folio. This was his last work. He died Nov. 1., 1724, and was buried in Norwich cathedral. Several posthumous tracts and letters, with a 'Life of Dr. Prideaux,' were published in 1748, 8vo.

PRIEST (Dutch, *priester;* French, *prêtre* (prestre); Spanish, *presbytero*, all remotely from the Greek πρεσβύτερος, *an elder*, and immediately from the Latin *presbyter*), in its popular acceptation, is the name of a minister of religion in all ages and countries. Priest is used to express the Greek *hiereus* (ἱερεύς) and the Latin *sacerdos*, which signify in general a sacrificer. Priest, in the formularies of the Church of England, is used in its original sense of presbyter, and points out the second degree of the ministers, to be admitted to which a man must be, according to the 34th canon, of the age of 'four and twenty years complete.'

PRIESTLEY, JOSEPH, the son of Jonas Priestley, a cloth-dresser at Birstal-Fieldhead, near Leeds, was born at Fieldhead, March 13, 1733, old style. His mother dying when he was six years of age, he was adopted by a paternal aunt, Mrs. Keighley, by whom he was sent to a free grammar-school in the neighbourhood, where he was taught Latin and the elements of Greek. His vacations were devoted to the study of Hebrew under a dissenting minister; he also made considerable progress in the Chaldee, Syriac, and Arabic. In the mathematics he received *some instruction from* Mr. Haggerstone: *without* the aid of a master he acquired some knowledge of the French, Italian, and German. At the age of *nineteen* (1752) he *entered* the dissenting *academy* at Daventry, conducted by Dr. Ashworth. During his residence at the *academy*, he composed the first part of his 'Institutes of Natural and Revealed Religion,' published in 1772; the remaining three parts appeared in 1773-74.

On quitting the academy in 1755, he became minister to a small congregation at Needham-Market in Suffolk, at an average salary of 30*l.* per annum. His free opinions however occasioned his congregation to desert him, and he maintained himself by keeping a school at Nantwich in Cheshire. While at Needham he composed his work entitled 'The Scripture Doctrine of Remission,' &c., published in 1761, the year in which he removed from Nantwich, to succeed Dr. Aikin, as tutor at Warrington Academy. Here he married the daughter of Mr. Wilkinson, an ironmaster of Wales, by whom he had several children. Here also he composed several works, among which is 'The History and Present State of Electricity, with Original Experiments,' 1767. In 1766 he had been elected a member of the Royal Society, and about the same time the honorary title of Doctor of Laws was conferred upon him by the University of Edinburgh. The approbation bestowed on his 'History of Electricity' induced him some time after to compose his 'History and Present State of Discoveries relating to Vision, Light, and Colours,' 2 vols. 4to. He relinquished his appointment at Warrington in 1767. His next engagement was at Mill-Hill Chapel, Leeds, where he published a pamphlet on 'Impregnating Water with Fixed Air' (1772); the same year he communicated to the Royal Society his 'Observations on Different Kinds of Air,' to which the Copley medal was awarded in 1773. To chemistry indeed he rendered important services. He discovered oxygen gas (which he called dephlogisticated air), nitrous gas, nitrous oxide gas, nitrous vapour, carbonic oxide gas, sulphurous oxide gas, fluoric acid gas, muriatic gas, and ammoniacal gas. In 1773 he

received the appointment of librarian and literary companion to the Earl of Shelburne, with a salary of 250*l.* a year with a separate residence. The connection lasted until 1780, when Priestley retired with an annuity of 150*l.* a year.

On leaving Lord Shelburne, he became minister to the principal dissenting congregation at Birmingham. In 1782 he published his 'History of the Corruptions of Christianity,' 2 vols. 8vo. A refutation of the arguments contained in this work was proposed for one of the Hague prize essays; and in 1785 the work itself was burnt by the common hangman, in the city of Dort. It was succeeded by his 'History of Early Opinions concerning Jesus Christ,' 1786, 4 vols. 8vo.

Priestley's vigorous opposition to the church now began to increase the number and importance of his enemies. His 'Familiar Letters to the Inhabitants of Birmingham' exasperated the populace, and his 'Reply to Burke's Reflections on the French Revolution,' having given rise to a public dinner, on July 14, 1791, in celebration of the anniversary of the destruction of the Bastile, at which however Priestley himself was not present, the excited mob rose, and after demolishing the place where the dinner had been given, they broke into his house, destroyed his philosophical apparatus, a valuable collection of books, and a large number of manuscripts, after which they made an unsuccessful attempt to burn the dwelling and what was left in it. In the meantime he and his family were forced to seek safety in flight. The sum awarded to him at the assizes as compensation is not stated, but he tells us that it fell short of his loss by 2000*l.* Individual generosity made amends. Among other instances of this kind, his brother-in-law made over to him the sum of 10,000*l.* invested in the French funds, besides an annuity of 200*l.* a year.

After this he removed to Hackney as the successor of his deceased friend Dr. Price [PRICE, RICHARD]; but finding his society shunned by many of his former philosophical associates, he embarked, April 7, 1794, with his family for America, and took up his abode at Northumberland, in Pennsylvania. In America, contrary to his anticipations, he was received with coolness and mistrust.

His wife died in 1796. His youngest son had died a few months previous. He himself died Feb. 6, 1804, expressing the satisfaction he derived from the consciousness of having led a useful life, and the confidence he felt of a happy immortality in a future state. His 'Theological and Miscellaneous Works,' in 25 vols. 8vo., Hackney, 1817, &c., contain also his autobiography and correspondence.

PRIMA'TES, the name given by Linnæus to his first order of Mammalia, within which he included Man, the Apes and Monkeys, the Lemurs and the Bats.

PRIMATI'CCIO, FRANCESCO, born at Bologna, in 1490, of a noble family, studied painting at Mantua, under Julio Romano. Frederic, Duke of Mantua, recommended him in 1531 to Francis I., king of France. In the great gallery of the royal palace of Fontainebleau, assisted by his pupil, Nicolo Abate, he painted, besides other works, fifty-eight pictures, each 6¼ feet high and 8 feet wide, representing the principal scenes of the Odyssey. The roof was decorated with fifteen large and sixty small pictures, chiefly subjects of heathen mythology. This great work was totally destroyed in 1738, when the gallery was pulled down. Francis II. gave him the abbey of St. Martin de Troyes, with a revenue of 8000 crowns, which he enjoyed till his death, in 1570. The oil-paintings of Primaticcio are excessively rare in Italy. Dr. Waagen says that a picture at Castle Howard, representing Penelope relating to Ulysses what had passed during his absence, is the finest work of this master that he had seen.

PRIME. A number is said to be prime when it is not divisible without remainder by any less number than itself, except unity. Thus 1, 2, 3, are of necessity prime; 4 is not, being divisible by 2; 5 is prime, and so are 7, 11, 13, 17, 19, 23, 29, 31, &c. Large lists of prime numbers have been published, but they are seldom possessed by the elementary student. As it is however frequently desirable to know whether a number not exceeding 10,000 is prime or not, we shall give a table to that extent, the manner of using which is as follows:—If we wish to know whether 2897 be a prime number, under the heading 2 and in the column 8 we look for 97, which we find there: whence the table shows that 2897 is a prime number. Again, by the same means we find that 1457 is not a prime number, the adjacent prime numbers being 1453 and 1459.

0.

0	1	2	3	4	5	6	7	8	9
1	01	11	07	01	03	01	01	09	7
2	03	23	11	09	09	07	09	11	11
3	07	27	13	19	21	13	19	21	19
5	09	29	17	21	23	17	27	23	29
7	13	33	31	31	41	19	33	27	37
11	27	39	37	33	47	31	39	29	41
13	31	41	47	39	57	41	43	39	47
17	37	51	49	43	63	43	51	53	53
19	39	57	53	49	69	47	57	57	67
23	49	63	59	57	71	53	61	59	71
29	51	69	67	61	77	59	69	63	77
31	57	71	73	63	87	61	73	77	83
37	63	77	79	67	93	73	87	81	91
41	67	81	83	79	99	77	97	83	97
43	73	83	89	87		83		87	
47	79	93	97	91		91			
53	81			99					
59	91								
61	93								
67	97								
71	99								
73									
79									
83									
89									
97									

1

0	1	2	3	4	5	6	7	8	9
09	03	01	01	09	11	01	09	01	01
13	09	13	03	23	23	07	21	11	07
19	17	17	07	27	31	09	23	23	13
21	23	23	19	29	43	13	33	31	31
31	29	29	21	33	49	19	41	47	33
33	51	31	27	39	53	21	47	61	49
39	53	37	61	47	59	27	53	67	51
49	63	49	67	51	67	37	59	71	73
51	71	59	73	53	71	57	77	73	79
61	81	77	81	59	79	63	83	77	87
63	87	79	99	71	83	67	87	79	93
69	93	83		81	97	69	89	89	97
87		89		83		93			99
91		91		87		97			
93		97		89		99			
97				93					
				99					

2.

0	1	2	3	4	5	6	7	8	9
03	11	03	09	1	03	09	07	01	03
11	13	07	11	17	21	17	11	03	09
17	29	13	33	23	31	21	13	19	17
27	31	21	39	37	39	33	19	33	27
29	37	37	41	41	43	47	29	37	39
39	41	39	47	47	49	57	31	43	53
53	43	43	51	59	51	59	41	51	57
63	53	51	57	67	57	63	49	57	63
69	61	67	71	73	79	71	53	61	69
81	79	69	77	77	91	77	67	79	71
83		73	81		93	83	77	87	99
87		81	83			87	89	97	
89		87	89			89	91		
99		93	93			93	97		
		97	99			99			

3.

0	1	2	3	4	5	6	7	8	9
01	09	03	01	07	11	07	01	03	07
11	19	09	07	13	17	13	09	21	11
19	21	17	13	33	27	17	19	23	17
23	37	21	19	49	29	23	27	33	12
37	63	29	23	57	33	31	33	47	23
41	67	51	29	61	39	37	39	51	29
49	69	53	31	63	41	43	61	53	31
61	81	57	43	67	47	59	67	63	43
67	87	59	47	69	57	71	69	77	47
79	91	71	59	91	59	73	79	81	67
83		99	61	99	71	77	93	89	89
89			71		81	91	97		
			73		83	97			
			89		93				
			91						

4.

0	1	2	3	4	5	6	7	8	9
01	11	01	27	09	07	03	03	01	03
03	27	11	37	21	13	21	21	13	09
07	29	17	39	23	17	37	23	17	19
13	33	19	49	41	19	39	29	31	31
19	39	29	57	47	23	43	33	61	33
21	53	31	63	51	47	49	51	71	37
27	57	41	73	57	49	51	59	77	43
49	59	43	91	63	61	57	83	89	51
51	77	53	97	81	67	63	87		57
57		59		83	83	73	89		67
73		61		93	91	79	93		69
79		71			97	91	99		73
91		73							87
93		83							93
99		89							99
		97							

5.

0	1	2	3	4	5	6	7	8	9
03	01	09	03	07	01	23	01	01	03
09	07	27	09	13	03	39	11	07	23
11	13	31	23	17	07	41	17	13	27
21	19	33	33	19	19	47	37	21	39
23	47	37	47	31	21	51	41	27	53
39	53	61	51	37	27	53	43	39	81
51	67	73	81	41	31	57	49	43	87
59	71	79	87	43	57	59	79	49	
77	79	81	93	49	63	69	83	51	
81	89	97	99	71	69	83	91	57	
87	97			77	73	89		61	
99				79	81	93		67	
				83	91			69	
								79	
								81	
								97	

6.

0	1	2	3	4	5	6	7	8	9
07	01	03	01	21	21	07	01	03	07
11	13	11	11	27	29	19	03	23	11
22	21	17	17	49	47	37	09	27	17
37	31	21	23	51	51	53	19	29	47
43	33	29	29	69	53	59	33	33	49
47	43	47	37	73	63	61	37	41	59
53	61	57	43	81	69	73	61	57	61
67	63	63	53	91	71	79	63	63	67
73	73	69	59		77	89	79	69	71
79	97	71	61		81	91	81	71	77
89	99	77	67		99		91	83	83
91		87	73				93	99	91
		99	79						97
			89						
			97						

7.

0	1	2	3	4	5	6	7	8	9
01	03	07	07	11	07	03	03	17	01
13	09	11	09	17	17	07	17	23	07
19	21	13	21	33	23	21	23	29	19
27	27	19	31	51	29	39	27	41	27
39	29	29	33	57	37	43	41	53	33
43	51	37	49	59	41	49	53	67	37
57	59	43	51	77	47	69	57	73	49
69	67	47	69	81	49	73	59	77	51
79	77	53	93	87	59	81	89	79	63
	93	83		89	61	87	93	83	93
		97		99	73	91			
					77	99			
					83				
					89				
					91				

8.

0	1	2	3	4	5	6	7	8	9
09	01	09	11	19	01	09	07	03	23
11	11	19	17	23	13	23	13	07	29
17	17	21	29	29	21	27	19	19	33
39	23	31	53	31	27	29	31	21	41
53	47	33	63	43	37	41	37	31	51
59	61	37	69	47	39	47	41	37	63
69	67	43	77	61	43	63	47	39	69
81	71	63	87	67	63	69	53	49	71
87	79	69	89		73	77	61	61	99
89	91	73			81	81	79	63	
93		87			97	89	83	67	
		91			99	93		87	
		98				99		93	
		97							

9.

0	1	2	3	4	5	6	7	8	9
01	03	03	11	03	11	01	19	03	01
07	09	09	19	13	21	13	21	11	07
11	27	21	23	19	33	19	33	17	23
13	33	27	37	21	39	23	39	29	29
29	37	39	41	31	47	29	43	33	31
41	51	41	43	33	51	31	49	39	41
43	57	57	49	37	87	43	67	51	49
49	61	77	71	39		49	69	57	67
59	73	81	77	61		61	81	59	73
67	81	83	91	63		77	87	71	
91	87	93	97	67		79	91	83	
	99			73		89		87	
				79		97			
				91					
				97					

PRIME'RO, a game at cards, so called from a situation in the game. He who holds the *prime* (primero), that is, a sequence of the best cards and a good trump is sure to be successful over his adversaries. Primero appears to have been one of the earliest games at cards played in England, and continued to be the most fashionable game throughout the reigns of Henry VIII., Edward VI., Mary, Elizabeth, and James.

PRIMOGENITURE may be defined to be that rule of English law by which a title of dignity or an estate in land comes to a person in respect of his being an eldest male. If a man dies seised of real estate, of which he had the absolute ownership, without having made any disposition of it by his last will, the whole descends to the heir-at-law, or customary heir; and the heir-at-law is such by virtue of being the eldest male person of those who are in the same degree of kindred to the person dying, or the representative of such eldest male. [DESCENT.] This is a case in which primogeniture operates. A common example of primogeniture is where a father dies absolutely entitled to real estate, and without disposing of it by will, in which case his eldest son takes it all. If land is settled or entailed on a man and his male issue, the eldest son takes the land by two titles, first as being a male, and next as being the eldest son. The law of primogeniture only applies in the case of land when the owner in fee dies without having made any disposition of it by will, or where the land is settled on a man and his male issue. It does not apply when the interest in land is a chattel interest, or a term of years; nor does it apply when real estate descends to daughters as coparceners.

At present, those who are the absolute owners of large landed estates seldom die without making a disposition of them by will. In the case of lands which are settled, the person in possession is generally tenant for life, and the inheritance is entailed on the eldest son. When the eldest son is about to marry, it is usual for the father and son to take the usual legal steps (which they can do as soon as the son is of age) to unsettle the estate and obtain the absolute ownership. They then resettle the estate, making the father tenant for life as before; the son, who was before tenant in tail, is also made only a tenant for life; and the inheritance is settled, as before, on the eldest son of the intended marriage. Such eldest son takes the estate, not as heir, and therefore not by the law of primogeniture, but he takes it as the person designated by the deed of settlement.

When a man happens to be tenant in tail, he usually takes the legal steps necessary (which he can do as soon as he is of age) to acquire the absolute ownership of the property, which he then generally settles again by deed or will, or disposes of absolutely.

It is usual in England to settle all large estates, and the object of the settlement is to keep the estates together, and to perpetuate them in one family; but there is a limit to this power of settlement. A man cannot, either by deed or will, settle his land, so as to prevent the absolute ownership of it from being obtained, for a longer period than a life or lives of persons in existence at the time when the settlement takes effect, and twenty-one years more.

Lands in GAVELKIND and BOROUGH ENGLISH are an exception to the general rule of law as to the descent of land.

The law of primogeniture then only operates in the cases already explained; and the system of settlements by which property is kept together in large masses is quite distinct in principle from the law of primogeniture. It is not the result of a law which favours primogeniture, but it is the result of the legal power which an owner of land has over it, and of the habits of the people. The various reasons which have laid the foundation of this habit, and which perpetuate it, are foreign to the consideration of primogeniture as a rule of law.

In Virginia, after the Revolution, an act was passed for converting estates tail into fee-simple, and at the same time the law of primogeniture was abolished. These laws have so far been in accordance with or have acted on public opinion, that a parent by his will now generally makes the same disposition of his property as the law makes in case he dies intestate. (Tucker's 'Life of Jefferson,' i. 96, &c.)

(*Remarks on Primogeniture and Entails*; Hayes, *Introduction to Conveyancing*.)

PRI'MULA, a genus of plants belonging to the natural order *Primulaceæ*. *P. vulgaris*, Primrose, is one of our commonest British plants. It is found in woods and thickets, and is one of the earliest of our spring flowers. *P. elatior*, Oxlip, is found in woods and meadows, but rarely in England. *P. veris*, Cowslip, is found plentifully in meadows and pastures in England. The flowers possess well-marked sedative and diaphoretic qualities, and make a pleasant soporific wine. *P. farinosa* is found in the north of England and Scotland, and is called the Bird's-Eye Primrose. *P. scotica* is found only in the north of Scotland. The flowers are of a bluish purple colour with a yellow centre. The leaves of *P. auricula* are used in the Alps as a remedy for coughs. These plants are valuable chiefly on account of their beautiful appearance and their early blossoming.

PRIMULA'CEÆ are monopetalous Exogenous plants. The Primulaceous Order consists of herbaceous plants inhabiting the temperate parts of the world, in moist situations, such as meadows, morasses, and alpine stations, or in the damp parts of woods, which they adorn with their lively flowers. The *Primula*, *Anagallis*, *Soldanella*, *Cyclamen*, and *Lysimachia*, of various species and under many forms, are the gayest of the genera, some of whose species are found in almost all gardens.

PRIMUM MO'BILE, the name given in the old astronomy to the imaginary sphere by the motion of which diurnal motion was given to the heavens.

PRINCE is the Latin word *princeps*, which was originally used to denote the person who was entitled Princeps Senatûs in the Roman State. He seems to have been originally the custos of the city, and his office was one of importance. Subsequently it became a title of dignity, and the princeps was named by the censors. (Liv. xxvii. 2.) Augustus adopted the title of princeps, as a name that carried no odium with it (Tacitus, 'Annal.,' i. 1); and this became henceforward the title of the master of the Roman world. The word prince, which is derived from princeps, is now applied to persons who have personal pre-eminence, and especially to certain sovereigns of small states who possess sovereign power; and also to others who possess the title without sovereign power or anything that distinguishes them politically from other nobles or persons who enjoy privileges. But the word seems not to have acquired so definite a sense as that which belongs to king, duke, marquis, earl, and some others of the class; but rather to denote persons of high rank in certain states, as in Prussia, Russia, Italy, and other continental states, or persons who are junior members of sovereign houses.

In England it has sometimes been the practice of the heralds to speak of a duke as the high and mighty prince; but the word seems rather to be restricted among us in its application to persons who are of the blood-royal, that is, a son, grandson, or nephew of a king; and it would probably be extended to the remote male posterity of such persons, though no case has arisen in the course of the last three centuries. But in its application it is merely a term of common language, not being conferred, like the title of duke, in any formal manner; and even the precedence which is given to blood-royal has respect to birth, and not to the enjoyment of this word as a title of honour. The eldest son of the king or queen regnant is made Prince of Wales by creation.

PRINCE EDWARD ISLAND, a British possession on the coast of North America, in the Gulf of St. Lawrence, is situated between 45° 48′ and 47° 7′ N. lat., and between 62° and 64° 27′ W. long. It extends from east to west in a somewhat curved line 135 miles in length. The width varies between 34 miles and one mile. The area is about 2160 square miles. It is separated from Nova Scotia and New Brunswick by Northumberland Strait, which in the narrowest part is hardly more than ten miles wide.

The coast is so intersected by bays and creeks, that there is hardly a place which is more than eight miles from the shore. The most remarkable of these bays, all of which form good harbours, is Hillsboro Bay, which enters the island from the south with a broad opening, but afterwards becomes so narrow that it appears like a river, and is called Hillsboro River: the tide ascends nearly to its extremity, twenty miles above Charlotte Town. The surface of the island consists of gentle undulations. The soil is in general productive. The climate is favourably distinguished from that of the surrounding countries by being exempted from fogs and being much less subject to cold. About one-half of the cultivable surface of the island is still wooded. The trees are principally pine, spruce-fir, hemlock, beech, birch, maple, poplar, and white cedar. Soil and climate unite to make this island an agricultural country. All kinds of grain and vegetables grown in England, and many of the fruits, grow very well. Flax is grown only for home consumption. The horses are small but hardy. The black cattle are of a smaller size than in England. Sheep and swine are plentiful, and the breed of the former has of late years been much improved. The wild animals are bears (which however have been nearly ex-

terminated) loup-cerviers, foxes, hares, otters, martens, musquashes, minks, squirrels, musk-rats, and weasels. Seals are found in the bays and along the shores in summer and autumn; and in summer immense numbers sometimes come down on the ice from the northward. Among the birds, the partridges are distinguished by their size, and wild pigeons are numerous. Fish as well as shell-fish are plentiful, and the oysters are considered the finest in America. Many cargoes are annually sent to Quebec and Halifax.

No minerals have been found on the island except red and white clay, fit for bricks and pottery.

The island is divided into three counties, King's County, Queen's County, and Prince's County. The population chiefly consists of Scotch emigrants and their descendants, some families of English extraction, and a few Acadians, or Americans of French origin. Charlotte Town, the capital and seat of government, is situated in Queen's County, on the north side of Hillsboro River, near its confluence with the rivers Elliot and York. The harbour is considered one of the best in the Gulf of St. Lawrence. The town stands on a gently-rising ground, and is regularly built, with broad streets intersecting each other at right angles. The population is about 4000. The population of the whole island was estimated, in 1844, at 56,000.

Ship-building is carried on in this island. The aggregate burthen of those built in 1844 was 9000 tons. The commerce of the island consists in the exchange of its agricultural produce, timber, deals, ships built, and fish, for British manufactures and other articles of domestic consumption.

Prince Edward Island was discovered by Cabot in 1497. It was taken possession of by the French after the settlement of Canada. In 1758 it was taken by the English. The government is conducted by a lieutenant-governor and a council, which also acts in a legislative capacity; and there is a House of Assembly. The English law is administered by a chief-justice, and there are district courts for the recovery of small debts.

PRINCE WILLIAM'S SOUND is a wide bay on the N.W. coast of North America, extending, with several branches, between 60° and 61° N. lat., and between 146° and 148° 30′ W. long. It opens to the south, and the entrance contains two large islands, of which the eastern is called Rose Island, and the western Montague Island. In both islands there are good harbours. Rose Island contains Port Etches, where the Russians have a factory, and a wooden fort, called Fort Constantine. The islands are rocky and mountainous. The country contains pine, alder, and hazel trees; and strawberries, raspberries, and alderberries. Sea-otters and foxes are met with, and other fur-bearing animals are abundant in the forests. The natives, who are few in number, and called Ooguliakhmutes, live mostly on the produce of their fishing. They seem to be a cross between the Esquimaux and the other Indians.

PRINCE OF WALES' ISLAND. [PENANG.]

PRINCE'S METAL, or *Prince Rupert's Metal*, an alloy of copper and zinc, which contains more copper than brass does, and is prepared by adding this metal to the alloy.

PRINCETON. [NEW JERSEY.]

PRINCIPAL. [AGENT.]

PRINCIPAL, the name of a stop or row of metal pipes in an organ, tuned an octave higher than the diapason, an octave lower than the fifteenth, and serving to blend the two, as well as to augment the volume of sound.

PRINCIPATO CITRA. [SALERNO.]

PRINCIPATO ULTRA is a province of the kingdom of Naples, bounded N. by Sannio and Capitanata, from which it is divided by the central ridge of the Apennines, E. by Capitanata, S. by Basilicata and Salerno, and W. by Terra-di-Lavoro. The province lies almost entirely in the Apennines, and between the western lower ridge of these mountains (which divides the basin of the Calore, an affluent of the Volturno, from the plains of Campania) and the central ridge, which forms the watershed between the Mediterranean and the Adriatic. The Calore and its affluents the Tamaro and Sabbato are the principal rivers of the province. A small part of Principato Ultra however extends along the eastern slope of the central ridge, where the Ofanto (Aufidus) has its source in the neighbourhood of Conza and Nusca.

Owing to the local situation of the province and its elevation above the sea, the temperature is considerably lower upon the whole than that of the plains of Campania, although in some of the valleys the summer heats are occasionally very great. Some places in the valley of the Calore are subject to the malaria in consequence of stagnant waters. The country produces corn, fruits in abundance, silk, some wine, and excellent pasture for cattle. The population in 1845 was 384,507. The area is 1405 square miles. The principal towns are, AVELLINO; ARIANO; Montesarchio, 13 miles N.W. from Avellino, with about 8000 inhabitants; Montefusco, with 3000; and Sant' Angelo-dei-Lombardi. The province is divided, for administrative purposes, into three districts—Avellino, Ariano, and Montefusco.

PRINCIPIA, the contracted title of the 'Philosophiæ Naturalis Principia Mathematica,' the great work of Newton, the publication of which is the most remarkable epoch in the history of science.

The common story of the fall of an apple was communicated by Newton's niece to Voltaire, and by her husband, Mr. Conduit, to Fontenelle. It is clear that Newton first thought on the subject in 1666. A letter from Hooke, written in 1679, gave occasion to his resuming his old thoughts, the subject of which was the curve in which a falling body descends to the earth, taking into account the earth's motion. The new attempt, as every one knows, was more successful, but Newton did not write any treatise nor contemplate any publication; he traced out the foundation of his system, and threw aside his papers. In January, 1684,

Halley had concluded from Kepler's third law, that the centripetal force on the planets (supposed to move in circles) was as the inverse square of the distance. Not being able to proceed further, he applied to Hooke and Wren, the former of whom professed to have solved the whole problem, but would communicate nothing; the latter declared that he had long given over the question from inability to succeed. In August following, Halley paid a visit to Newton at Cambridge, who informed him that he had solved the problem, but 'was not able to lay his hand on the papers which contained his solution,' so completely had he thrown the subject aside. After Halley's departure, he worked the theorems out again, and transmitted them to Halley through Mr. Paget, the mathematical master at Christ's Hospital. On receipt of this communication, in November, Halley immediately paid another visit to Cambridge, to gain more information, and to induce Newton to pursue the inquiry. December 10, 1684, Halley stated at the Royal Society that 'he had lately seen Mr. Newton at Cambridge, and that he had shown him a curious treatise 'De Motu,' which, upon his desire, he said was promised to be sent to the Society to be entered upon their register.' Halley and Paget were accordingly deputed to keep Newton in mind of his promise (a singular proceeding, showing how well the Society knew Newton's indifference about communicating), and the consequence was, that about the middle of February, 1685, a communication (that previously made to Halley, enlarged), entitled 'Isaaci Newtoni Propositiones de Motu,' was sent and registered: it contains what were afterwards the main theorems of the early sections of the Principia, direct and inverse, relating to centripetal forces. No principia as yet existed, and even this basis had only recently been written down satisfactorily. Newton writes to Mr. Aston, Secretary to the Royal Society, in acknowledging the news of the above entry, 'I designed them for you before now, but the examining several things has taken a greater part of my time than I expected, and a great deal more of it to no purpose. And now I am to go into Lincolnshire for a month or six weeks. Afterwards I intend to finish it as soon as I can conveniently.' (February 23, 1685.) On this Mr. Rigaud well remarks, 'The Principia was not a protracted compilation from memoranda which might have been written down under the impression of different trains of thought: it had the incalculable advantage of being composed by one continued effort, during which the mutual bearing of the several parts was vividly present to the author's mind.' On the 21st of April, 1686, Halley announced to the Royal Society that Mr. Newton 'had an incomparable Treatise on Motion almost ready for the press;' and on the 28th of the same month Dr. Vincent presented the manuscript of the first book to the Society, who referred the question of printing to the Council, and the production of a report upon the contents to Halley. May 19, the Society decided that the work should be printed forthwith in quarto, &c.; and hence it has always been supposed that the Society paid the expenses of printing, though the title page only bears 'jussu Societatis,' &c., and not 'jussu et sumptibus,' as usual where it bore the expenses. But Mr. Rigaud quotes the minute of the Council of the Society of the 2nd of June, confirming the vote of the Society to the extent of resolving 'that Mr. Newton's book be printed,' but adding that 'E. Halley shall undertake the business of looking after it, and printing it at his own charge, which he engaged to do.' The fact was, that when the Council came to consider the Society's vote of the 19th of May, they found there was no money. A work of Francis Willughby 'De Historia Piscium,' published 'jussu et sumptibus,' in 1686, had so reduced their funds, that they were obliged to pay their officers in copies of this very book about fishes.

In the meanwhile arose a controversy with Hooke, the universal claimant, who, when the first part of the manuscript was presented by Vincent, asserted that he had discovered the law of the inverse squares, and had communicated that and other discoveries to Newton. On this controversy see the 'Penny Cyclopædia,' article 'Principia.'

Newton had completed the first draught of the work by the end of 1685, though none of it was sent till April, 1686. The third book was presented to the Society, April 6, 1687, in proof, probably, since the whole was published (at ten or twelve shillings a copy) about Midsummer, 1687. The order of the Council of the Society to license the book was made on June 20, 1686, and the imprimatur of Pepys was dated July 5.

The part which Halley had in the matter would alone immortalise his name. He found out the ability of Newton to write such a work, prevailed upon him to write it, took charge of the publication, prevented the author from materially mutilating it in disgust, paid the expenses of printing, at a time when, owing to his father's death and consequent litigation, he had nothing to spare (which never happened to him before or after), gave a copious explanation of it in the 'Philosophical Transactions,' and is generally admitted to have been for a long time the only person in Europe who showed that he thoroughly appreciated the value of the work, and knew the place it must occupy in the history of discovery.

The interest attached to the second and third editions of the Principia (superintended by Cotes in 1713, and by Pemberton in 1726) is considerable, with reference to the alterations made in them by Newton. It would not however be worth while to specify these alterations, which are numerous, some in correction of errors, others in extension of views.

The Principia of Newton contains the Dedication to the Royal Society, a short Preface, Verses by Halley in honour of Newton, Definitions, Axioms, a first book on Unresisted Motion, a second on Resisted Motion, and a third on the System of the Universe. Halley's verses were somewhat altered by Bentley in the second edition, but the original readings were very nearly restored in the third. Newton wrote a short preface for each of the editions, and Cotes one of considerable length for the second. The dates of the Newtonian prefaces

are, May 8, 1686; March 28, 1713; January 12, 1725-6.

PRINGLE, JOHN, the youngest son of Sir John Pringle, bart., was born at Stichell-House in Roxburghshire, April 10, 1707. He studied at the universities of St. Andrews and Leyden, and took his degree as doctor of physic at the latter place. On quitting Leyden he proceeded to Paris, where he completed his medical studies, after which he settled as a physician at Edinburgh. He had not, however, given his attention exclusively to medicine. In 1734 he was appointed to the professorship of moral philosophy in the university of Edinburgh. In 1742 he was nominated physician to the Earl of Stair, who then commanded the allied armies of England and Austria, and was present at the battle of Dettingen, on June 26, 1743. Shortly afterwards he was appointed physician-general to the British forces in the Low Countries. Through his exertions a convention was entered into, in 1743, between Lord Stair and Marshal Noailles, for the mutual protection of the hospitals of both armies.

Dr. Pringle was recalled from Flanders in 1745, in order to attend the army employed under the Duke of Cumberland in suppressing the Scotch rebellion. In 1747 he again accompanied the army abroad; but on the conclusion of the peace of Aix-la-Chapelle (30th April, 1748), he returned to England; after which he resided principally at London, as physician in ordinary to the Duke of Cumberland. Besides being elected a member of most of the scientific societies, both at home and abroad, he was, in 1761, appointed physician to the queen's household, and in 1763 physician extraordinary to her majesty. In 1772 he was elected president of the Royal Society, and in 1774 he was appointed physician extraordinary to the king.

In 1781 he removed to Edinburgh, but returned to London the same year. On quitting Edinburgh he presented the College of Medicine in that city with three manuscript volumes in folio, on condition that they should neither be suffered to leave the college nor to be printed. He died Jan. 18, 1782, and a monument, by Nollekens, was erected to his memory in Westminster Abbey. His chief work was 'On the Diseases of the Army;' it was published in 1752, went through several editions, and was translated into French, German, and Italian. A list of his published works is given in Watt's 'Bibliotheca Britannica,' but few of them possess much interest now.

PRINGLE, THOMAS, was born Jan. 5, 1789, at Blaiklaw, in Tiviotdale, Scotland. His father was a farmer in Roxburghshire. When very young, Pringle's hip-joint was dislocated by an accident, and he was obliged to use crutches for life. After studying at the University of Edinburgh, he became a clerk to the Commissioners on the Public Records of Scotland. In 1811 Pringle and a friend published a poem called 'The Institute,' which obtained them some praise but no profit, and this was succeeded by some other poetical effusions. Early in 1817 the 'Edinburgh Monthly Magazine' appeared, of which Pringle became the editor. The magazine soon fell into the hands of other proprietors, and changed its title to that of 'Blackwood's Magazine,' Pringle still continuing to be the editor, at the same time that he became joint editor of 'Constable's Magazine;' but disputes between Pringle and Blackwood led in a short time to a separation. Before this untoward event took place he had married. He had also been appointed to the editorship of 'The Star,' Edinburgh newspaper, but he now resigned it; and he probably derived little emolument from 'Constable's Magazine,' for in January, 1819, he was again in the Record Office, performing the duties of a copying clerk.

Meantime Pringle's four brothers, all of whom were farmers, had become more or less unprosperous, and he proposed that they should avail themselves of the government scheme of colonising the unoccupied territory at the Cape of Good Hope. Their party of 24 persons, arrived at the Cape of Good Hope in April, 1820. Pringle obtained the situation of librarian to the government library at Cape Town, and, in conjunction with his friend, Mr. Fairbairn, organised a private academy on an extensive scale, which was prosperous beyond their expectations.

He soon afterwards started the 'South African Journal,' one edition in English and one in Dutch. Mr. Greig, a printer, then commenced the 'South African Commercial Advertiser,' a weekly newspaper, of which Pringle became editor, as well as of the 'Journal.' The two works were prosperous, the pupils of the academy increased, and Pringle fancied himself about to make a rapid fortune.

A man of the name of Edwards was tried for a libel on the governor, and the trial, like others, was expected to be reported. On this occasion, however, the Fiscal was ordered to proceed to the printing-house, and assume the office of censor of the press. Pringle refused to submit to any such interference, discontinued both publications, resigned his appointment as librarian, left the Cape in July, 1826, and arrived in London. He applied to the government for compensation for his losses, which he estimated at 1000*l.*, but in vain. Meantime he was engaged as secretary to the Anti-Slavery Society, a situation which he held till slavery was abolished. He became the editor of 'Friendship's Offering,' wrote and published a 'Narrative of a Residence in South Africa,' and contributed to the chief periodical works of the day.

He died Dec. 5, 1834. His reputation as an author depends mainly on his 'Narrative' and his 'Poems.'

PRI'NIA, Dr. Horsfield's name for a genus of Birds, of which the *Familiar Creeper* of Latham (*Prinia familiaris*) is an example. Locality, Java.

PRINOS, a genus of plants belonging to the natural order *Aquifoliaceæ*. *P. verticillatus* has a very bitter bark, which has been substituted for Cinchona bark in cases of fever. Dr. Meere recommends it for its antiseptic powers, and the American practitioners employ it as a lotion in cutaneous disorders and in cases of gangrene. *P.*

glaber, Glabrous Winter Berry, is native of North America from Canada to Florida. The berries are black, and are called in Jersey *Ink Berries*. It is a low handsome shrub, and is said to be one of the plants the leaves of which are sometimes used instead of Paraguay Tea.

PRINSEP, JAMES, an Englishman, descended from a family of Swiss extraction, was born in 1800, and at an early age entered the service of the East India Company. He was appointed assay master at Benares, where he remained about ten years. Here he collected the materials of his 'Sketches of Benares.' When the Benares mint was abolished, Prinsep was transferred to that at Calcutta. He then became secretary to the physical class of the Asiatic Society, and editor of the 'Gleanings of Science,' which he remodelled in 1832, under the title of the 'Journal of the Asiatic Society.' His attention having been directed to the subject of Bactrian coins, he made numerous discoveries which enabled him to fill up the blank left in the history of the successors of Alexander the Great in Bactria. In 1832 he became secretary to the Asiatic Society, and began to follow up the steps of Jones, Colebrooke, and Wilson, in the field of Indian antiquities. The most interesting of his discoveries is the deciphering of inscriptions which had remained a sealed book to all previous Orientalists. He died April 22, 1840.

PRINSE'PIA, a genus of plants of the natural family of *Chrysobalaneæ*. The genus consists of only a single species, remarkable for its thorny appearance. The seeds are large, and yield by expression an oil which is highly esteemed by the mountaineers of the Himalayas, where it is indigenous, and which by Europeans is thought a good substitute for salad oil.

PRINTING. Printing from blocks has been known in China since the middle of the 10th century, and that mode of printing is still practised there. Even in Europe, although writing, unlike that of the Chinese, is alphabetic, printing from blocks was the method first practised. Some have even supposed that the knowledge of the art was originally obtained from China. But, as far as we can trace, it was not till fully a century after Marco Polo returned from that country that even this simplest kind of printing began to be practised in Europe. It appears to have been first applied to the fabrication of playing cards and manuals of popular devotion. The æra of these block prints and books, as they are called, may be stated to be the first half of the 15th century: one in Lord Spencer's collection bears the date of 1423, and there is reason to believe that other specimens were executed almost as late as 1450. Of the block-books of any considerable magnitude the two most remarkable are—the 'Biblia Pauperum,' a small folio of forty leaves, each containing a picture, with a text of scripture or some other illustrative sentence under it, which is supposed to have been produced some time between 1430 and 1450; and the 'Speculum Humanæ Salvationis,' consisting of sixty-three leaves of the same small folio size, containing in all fifty-eight pictures, with two lines of Latin rhyme under each. With regard however to this last block-book there has been a great deal of disputation, some denying altogether its claim to be reckoned a specimen of block-printing, in so far as the legends are concerned. The probability is that at first the 'Speculum' was entirely a block-book, but that in subsequent editions the block-printing was mixed with printing from movable types. These block-books are, like the Chinese books at this day, printed only on one side of the leaf; and they all appear to have been produced in the Low Countries.

The art of printing, in its essential principles the same as now practised, had certainly been discovered before the middle of the 15th century; but when, where, and by whom, each successive improvement of the original pigment-printing by means of engraved blocks was discovered and first put in practice, is not so easily settled. The employment of movable types, the production of such types by the process of casting them in metal, and the cutting of the punch, or stamp of hardened steel, with which the face of the type is impressed in copper to be afterwards used in the matrix, or mould, in casting—these may be considered as the three great mechanical changes, by which block-printing was transformed into the art as it now exists.

Four names have principally figured in the controversy that has been raised about the invention of printing:—John Gutenberg (paternally Gensfleisch), of Strasburg; John Fust (or Faust), of Mainz; Peter Schoeffer (in Latin, Opilio), of Gernsheim; and Lawrence Coster (or Janszoon), of Haarlem. The probability is, that Coster was one of the early block-printers, whose art, there is every reason to believe, was first practised in Holland. The use of separate letters, or types, at first of wood and afterwards of metal, and the various improvements in the manner of casting them, are all to be attributed to Gutenberg, Fust, and Schoeffer. Gutenberg, it is now generally supposed, first began to print at Strasburg with movable types of wood some time between 1436 and 1442. Having then established himself in Mainz, which was his native town, he there, in 1445, entered into partnership with Fust, who seems to have assisted Gutenberg in devising or carrying into effect his subsequent great improvement of the art, by casting the types of metal. But to Schoeffer, who was in the service of Gutenberg and Fust, and had married Fust's daughter, is assigned the credit of having facilitated and (as far as the principle was concerned) brought to perfection the process of founding by the contrivance of the punch.

An ancient chronicle, first printed at Cologne in 1474 ('Chronica, sive Fasciculus Temporum,' &c., commonly called the 'Cologne Chronicle'), notes that, after ten years had been spent in preparation, the art of printing began to be practised (cœptum est imprimi) in 1450, and that the first book that was printed was the 'Mazarin Bible,' many copies of which have been discovered. It is without either date or printer's name, but appears to have been completed before 1455.

The knowledge of the art was first made public

and carried into other countries by the dispersion of many of the workmen on the storming of Mainz by Adolphus of Nassau, in 1462. Printing was first practised in Italy, in the town of Subiaco, in the Roman territory, in 1465; in France, at Paris, in 1469, in England, at Westminster, in 1474; and in Spain, at Barcelona, in 1475. It is said that by the year 1530 there were already about 200 printing-presses in Europe.

Among the principal works upon the invention and history of printing, are—Bern. à Mallinkrot, 'De Ortu et Progressu Artis Typographicæ,' 4to., Colon. Agrip., 1639; Jac. Mentelii 'De Typographiæ Origine Paræneses,' 4to., Paris, 1650 (this is an assertion of the claim of the author's ancestor of the same name); J. de la Caille, 'Histoire de l'Imprimerie,' 4to., Paris, 1689; And. Chevillier, 'L'Origine de l'Imprimerie de Paris,' 4to., Paris, 1694; Fra. Pellegrino Antonio Orlandi, 'Origine e Progressi della Stampa,' 4to., Bologna, 1722; Jo. Ch. Wolfii 'Monumenta Typographica,' 2 tom., 8vo., Hamb., 1740; Pros. Marchand, 'Histoire de l'Origine et des Progrès de l'Imprimerie,' 4to., La Haye, 1740; Mich. Maittaire, 'Annales Typographicæ,' 5 tom., 4to., Hag. Com., Amstel., et Lon., 1719–1741; P. S. Fournier, 'Dissertation sur l'Origine de l'Imprimerie,' 8vo., Paris, 1759; Jo. Dan. Schœpflini 'Vindiciæ Typographicæ,' 4to., Argentor., 1760; Gerardi Meermann, 'Origines Typographicæ,' 2 tom., 4to., Hag. Com., 1765; Ch. Hen. Baron Heinecken, 'Idée Générale d'une Collection Complète d'Estampes,' 8vo., Leipz., 1771; P. Lambinet, 'Recherches sur l'Origine de l'Imprimerie,' 8vo., 1798, and 2 tomes, 8vo., 1810; Singer's 'Researches into the History of Playing Cards;' Ottley's 'History of Engraving;' Fried. Metz, 'Geschichte des Buchhandels und der Buchdrückerkunst,' Darmstadt, 1834; and Jackson's 'Treatise on Wood Engraving,' London, 1839.

PRINTING, CALICO. [CALICO-PRINTING.]

PRINTING-PRESS. The term printing-press is applied to the machine used for letter-press printing or copper-plate printing, but more usually the former. The date of the invention of the printing-press is unknown, but some contrivance for this purpose must have been used as soon as printing by blocks or types was introduced. The increased force requisite to make an impression, the size of the surface to be printed from being increased, would soon suggest recourse to some of the simple machines or mechanical powers for the modification of the power requisite to obtain the necessary pressure. The screw, as applied in the common screw-press, would obviously suggest itself; and accordingly, in all the earlier printing-presses, the screw alone is used.

The operations to be performed in the process of printing will point out the essential parts of a printing-press. The types, being set up and arranged in a chase (or iron frame) of suitable dimensions, which is then called a *form*, have to be inked; this is effected by passing across them a cylinder, or roller, covered with an elastic composition of molasses and glue, which has been first rolled in a thick ink made of lamp-black and burnt oil. The paper to be printed has to be laid on the type when inked, and then the requisite pressure for making the impression has to be applied.

The earliest form of printing-press very closely resembled the common screw-press, as the cheese or napkin press, with some contrivance for running the form of type, when inked, under the pressure, and back again when the impression was made. This rude and inconvenient form of press was superseded by the invention of Blew, a printer of Amsterdam. Other improvements were from time to time introduced; but they were all superseded, about the commencement of the present century, by an invention of Lord Stanhope.

In the *Stanhope Press*, as in the common wooden screw-press, the form of type is laid upon a table which has a horizontal traversing motion. To the carriage on which the form moves are attached the tympans, which are light frames covered with parchment, so constructed that the inner tympan just lies within the outer tympan. Some blanketing is placed between the tympans, so as to equallise the pressure upon the surface of the types. To the outer tympan is attached a skeleton frame called the frisket. The sheet of paper to be printed being placed on the outer tympan, the frisket is turned down upon it; and then the frisket and tympans are turned down upon the form of type. The frisket is covered with paper, cut out so that the sheet to be printed, when placed between the tympan and frisket, and folded down together on the form, may be in contact with the surface of the type, while the remainder of the frisket-sheet preserves the margin from being soiled.

The form of type being inked, and the tympans and frisket, with the sheet of paper between them, folded down on the form, the whole is made to traverse, by means of a crank-handle, until it comes beneath the platten, which is a massive plate of cast-iron, movable up and down perpendicularly. The principal improvement of the Stanhope Press consists in the manner in which the descending motion is given to the screw. The carriage is then run back, the frisket and tympans unfolded, and the printed sheet being taken out, the same operation is repeated.

The principle of the Stanhope press has been followed out by several subsequent inventors, and improvements of mechanical detail introduced, tending to the economy of time and labour, and to precision of workmanship. In the Ruthven Press, the form of type remains stationary, and the plattin is removed to permit the type to be inked: and in this, as well as the Columbian Press, the pressure is produced by a combination of levers alone, without the use of any portion of a screw of inclined plane.

The press for Copper-Plate Printing consists of two cylinders, or rollers, of wood, supported in a strong wooden frame, and movable about their axes, one placed just above and another just below the level of the table upon which the plate to be printed is laid. The upper roller is turned round by the arms of a cross fixed to its axis. The copper-plate being inked, the paper on which the impression is to be taken, and two or three

folds of soft material as blanketing, are placed upon it. The plate so prepared is moved along the table to the junction of the two rollers, and the upper roller being turned by the arms of the cross, the plate, with its furniture, is passed through the press. The rollers may be placed nearer to or farther from each other, according to the amount of pressure requisite for making a good impression, that is, according to the depth of the engraving and the degree of blackness which the impression is required to have.

PRINTING-MACHINE. The printing-press, though much improved during the last half century by the ingenuity of Lord Stanhope and others, is quite inadequate to a rate of production equal to the present demand. The attention of practical men was consequently directed to some more rapid means of production, and as early as 1790, even before the Stanhope-Press was generally known, Mr. W. Nicholson had letters-patent for a machine similar in many respects to those which have now come into use. Subsequently Mr. König, a German, conceived nearly the same idea, and meeting with the encouragement in this country which he failed to obtain on the Continent, constructed a Printing Machine, and on the 28th of November, 1814, the readers of the 'Times' were informed that they were then for the first time reading a newspaper printed by machinery driven by steam-power. This printing-machine, though highly ingenious, was very complicated, and the machine of König was soon superseded by that of Messrs. Applegarth and Cowper, the novel features of which were accuracy in the register, an improved method of inking the type, and great simplicity in parts previously very complicated. Printing-machines are either single or double; the single being that in which only one side of the sheet of paper is printed, the double that in which both sides are printed before the sheet leaves the machine. The single machine is used for newspapers and that kind of printing in which it is not necessary for the two sides of the sheet to 'register,' that is, for the printing on one side to be exactly at the back of the other; the double machine for books, in which it is essential that the printing on one page should correspond with the printing on the other when the sheets are folded. This important object of the register is effected by causing the parts to move at precisely the same speed. This being the principle of the register, its success will depend on great accuracy of workmanship in the mechanical parts. In the double printing-machines now in use, the sheet of paper is laid on the feeder, which consists of girths of linen tightly stretched by being passed round two cylinders. By the motion of this feeder the sheet is placed between two systems of tapes, which lie two and two over each other on a series of cylinders and rollers. The sheet of paper grasped between them is kept clean at the places in which it is in contact with them, and by the motion of the various parts is conducted under the first printing-cylinder, and receives an impression from the first set of types; thence by means of two other cylinders to the second printing-cylinder, where it receives an impression on the other side from the second set of types. Thus printed on both sides, it is taken out by an attendant. An inking apparatus is placed at each end of the table which carries the types, and which traverses backwards and forwards under the printing-cylinders and inking-rollers. The ink, received from a reservoir by two rollers, is transferred from them to the surface of the inking-table; the surface of the table inks two other rollers, and these, in their turn, ink the types as they pass backwards and forwards for each impression. The excellence of the printing depends in a great measure on the type being properly inked. The machines commonly used for printing books will print from seven hundred to one thousand per hour, in perfect register; and for newspapers, printed on one side only, from four thousand to six thousand per hour.

The machine with which 'The Times' London newspaper is now (1850) printed, is still more surprising than any of the former for the number of copies which it can print in an hour. In this machine the type is arranged vertically.

PRIONI'TES, Illiger's name for a genus of birds, commonly termed Motmots, or Momots, from their monotonous note. These birds 'live only in the tropical forests of the New World, preferring those deep recesses of perpetual shade where a high canopy of matted foliage nearly excludes the rays of a vertical sun. They appear even more solitary in their disposition than the Trogons. Their note may be heard, morning and evening, from the depths of the forests, but the bird is never seen, unless the hunter comes unexpectedly upon its retreat. This we have generally found to be a low withered branch completely shaded and just at the end of such paths as are made by the Cavies of the Indians. The Jacamars and the Trogons both love these shady nooks, where they sit nearly motionless, watching for passing insects, on which they dart. Such is, no doubt, the manner in which the Motmot feeds; but his strong conformation enables him to capture larger game. Travellers assert that he also devours the eggs and young of other birds, like the Toucans: this we believe, as both have the same long and feather-like tongue.' (Swainson.)

Example, *Prionites Mexicanus*.

PRIO'NODON, Dr. Horsfield's name for a feline form (*Felis gracilis*), and placed by him in a separate section under the name of *Prionodontidæ*, between *Felis* and *Viverra*.

Dr. Horsfield discovered this animal in 1806, during the early period of his researches in the district of Blambangan, situated at the extremity of Java. Dr. Horsfield was not able to ascertain whether it is found in any other part of the island, but he states that even in Blambângan it is rarely met with.

PRIOR, MATTHEW, born July 21, 1664, is said to have been the son of a joiner in London. His uncle, who kept the Rummer Tavern near Charing Cross, sent him to Westminster School. He attracted the notice of the Earl of Dorset, who sent him, in 1682, to St. John's College, Cambridge, where he was admitted to his bachelor's degree in 1686, and obtained a fellowship. In

1687, Prior, in conjunction with Charles Montague, afterwards Earl of Halifax, published 'The City Mouse and Country Mouse,' in ridicule of Dryden's 'Hind and Panther.' After the Revolution of 1688, Prior came to London, and was appointed secretary to the embassy to the Hague in 1690, and afterwards King William made him one of the gentlemen of his bedchamber. In 1697 he was appointed secretary to the embassy which concluded the peace of Ryswick, and the next year filled the same office at the court of France. In 1699 he became under-secretary of state, but losing his place soon after, he was appointed in 1700 one of the commissioners of trade. This year he published the 'Carmen Seculare,' in which he celebrates the virtues and heroic actions of King William. He had previously distinguished himself by an Ode on the death of Queen Mary.

In the parliament that met in 1701 Prior sat as member for East Grinstead. Soon after this he joined the Tory party. In July, 1711, the Tories being in power, Prior was sent privately to Paris with proposals of peace, and in 1713 he received the formal appointment of ambassador to that country. In 1714 the Tories lost office, and Prior was recalled by the Whigs, by whom he was committed on a charge of high treason, and remained in custody two years. The fact that a private meeting between Mesnager, one of the French ministers, and some members of the English government, had taken place in Prior's house during the peace negotiations, was made the groundwork of this charge. During his confinement he wrote his poem of 'Alma.' He was now without the means of subsistence, except from his fellowship; but the publication of his poems by subscription, which amounted to 4000 guineas, and an equal sum added by Lord Harley for the purchase of Down Hall in Essex, restored him to easy circumstances. He died at Wimpole, a seat of the Earl of Oxford, in Cambridgeshire, Sept. 18, 1731, at the age of 57. A monument was erected to him in Westminster Abbey.

Prior seems to have been well fitted for the public situations which he filled. As a poet he was once popular. His Tales, though borrowed and mostly indecent, are told with ease and sprightliness, and his Epigrams are often neatly pointed. "Solomon" is one of the best of his poems. Prior had diligence and judgment, and may be regarded as one of the most correct of English poets, but his poetry is not of a high class.

PRIORY. [ABBEY.]

PRISCIA'NUS, a Roman grammarian, who is said to have been a professor of grammar at Constantinople in the time of Justinian, about A.D. 525. His treatise 'De Arte Grammatică,' in eighteen books, is a useful work. There are several other treatises of his extant. The best editions of Priscianus are by Putschius in his 'Grammaticæ Latinæ Auctores Antiqui,' 4to., Hanov., 1605; and by Krehl, 8vo., Leipzig, 1819-20. The 'Opera Minora,' were also edited by Lindemann, Leyden, 8vo., 1818.

PRISM (πρίσμα), in Mathematics, is a solid formed by a straight line which moves parallel to a given straight line, and one end of which traces out the contour of a given rectilinear polygon. The other extremity of the moving straight line traces out an equal and similar polygon, placed parallel to the former one: and the prism is thus bounded by two equal and parallel polygons, joined by as many parallelograms as each polygon has sides. When these parallelograms are at right angles to the planes of the polygons, the solid is called a *right prism*; in all other cases, an oblique prism. The prism is among plane solids what the cylinder is among curvilinear ones. It is also called triangular, quadrangular, pentagonal, &c., according as the polygons have three, four, five, &c. sides. Thus the prism used in optics is a triangular prism, while the parallelopiped is a quadrangular prism.

PRISONS. [SECONDARY PUNISHMENTS.]

PRISTIDACTYLS, the name assigned by MM. Duméril and Bibron to a group of *Cœlodonts*, being the second of their *Lézards Lacertiens ou Autosaures*.

The following genera are arranged by MM. Duméril and Bibron under this group:—*Psammodromus, Ophiops, Calosaura, Acanthodactylus, Scapteira*, and *Eremias*.

PRIVAS. [ARDÈCHE.]

PRIVATEER, a private ship of war, fitted out at the cost of an individual for the purpose of carrying on hostilities on his own account, but with the permission of a belligerent state, against the public enemy. It is the practice of most nations to commission vessels of this kind as auxiliaries to the public force. The owners of them are licensed to attack and plunder the enemy, and their enterprise is encouraged by allowing them a large portion of any property which they may capture. It is usual for the country on whose behalf they carry on war, to take security for their duly respecting the rights of neutrals and allies, and observing generally the law of nations. In Great Britain persons are empowered to fit out privateers by letters of marque, which are granted by the crown upon application in due form. (45 Geo. III. c. 72; Blackstone, *Commentaries*, i., p. 259.; 1 Kent's *Commentaries*, 96.)

PRIVET. [LIGUSTRUM.]

PRIVILEGE (Latin *Privilegium*, from the sense of which however it has been perverted), a particular beneficial exemption from the general rules of law. Privilege is of two kinds; *real*, attaching to place, and *personal*, attaching to persons, as ambassadors, peers, members of parliament, and attorneys.

Formerly many places conferred the privilege of freedom from arrest, even in criminal matters, upon those who entered them; and even in later times many places existed which privileged those within them from arrest in civil suits. Of these the most notorious were White Friars, the Savoy, the Mint, and other places in their neighbourhood. But by 8 & 9 Wm. III. c. 27, the privileges of all those places were abolished. However, at the present time, no arrest can be made in the king's presence, nor within the verge of the palace of Westminster, nor in any palace where he resides, nor in any place where

the king's justices are sitting (3 'Inst.,' 148). Personal privilege, which gives freedom from arrest, is enjoyed by all suitors, counsel, witnesses, or other persons attending any courts of record upon business, or an arbitrator under a rule of Nisi Prius. This exemption is to be interpreted liberally, and will not, therefore, be forfeited by taking refreshment after a suit, or by going other than the direct road to or from a court. (Com. 'Dig.,' tit. 'Privileges.') The privileges of the Members of the House of Peers and of the House of Commons are stated under PEERS and PARLIAMENT.

PRIVY COUNCIL. The Privy Council, or Council Table, consists of the assembly of the king's privy councillors for matters of state. During the existence of the Star Chamber, the members of the privy council were also members of that court. Their number was anciently about twelve, but is now indefinitely increased. The present usage is, that no members attend the deliberations of the council who are not especially summoned for that purpose. Members of the privy council must be natural-born subjects of England, and are nominated by the king without any patent or grant. After nomination and taking the oath of office, they immediately become privy councillors. Formerly they remained in office only during the life of the king, who chose them subject to removal at his discretion; but by 6 Anne, c. 7, the privy council continues in existence six months after the demise of the crown, unless sooner determined by the successor, and they are to cause the successor to be proclaimed. The privy council of Scotland is now merged in that of England, by 6 Anne, c. 6. The duties of privy councillors, as stated in the oath of office, are—to the best of their discretion truly and impartially to advise the king; to keep secret his counsel, to avoid corruption, to strengthen the king's council in all that by them is thought good for the king and his land, to withstand those who attempt the contrary, and to do all that a good councillor ought to do unto his sovereign lord. By the Act of Settlement (12 & 13 Wm. III. c. 2) all matters relating to the government properly cognisable in the privy council are to be transacted there; and all the resolutions taken thereon are to be signed by such of the privy council as advise and consent to them.

The court of privy council is of great antiquity; and during earlier periods of our history appears not always to have confined itself to mere matters of state. It had always and still has power to inquire into all offences against the government, and to commit offenders for the purpose of trial in some of the courts of law; but in former times it often assumed the cognisance of questions merely affecting the property and liberties of individuals.

The 16 Chas. I. c. 10, prevented the privy council from meddling in civil cases, and acting contrary to the laws of the land; but in matters arising out of the jurisdiction of the courts of the kingdom, as in colonial and admiralty causes, and also in other matters, where the appeal was to the king himself in council, the privy council continued to have cognisance, even though the questions related merely to the property of individuals. By 2 & 3 Wm. IV. c. 92, the powers of the high court of delegates, both in ecclesiastical and maritime causes, were transferred to the king in council. By the 3 & 4 Wm. IV. c. 41, the jurisdiction of the privy council is further enlarged, and there is added to it a body entitled 'the judicial committee of the privy council.' This body consists of the keeper of the great seal, the chief justices of the King's Bench and of the Common Pleas, the master of the rolls, the vice-chancellor of England, the chief baron of the exchequer, the judge of the prerogative court of Canterbury and of the high court of admiralty, the chief judge of the bankruptcy court, and all members of the privy council who have been presidents of it, or have held the office of chancellor or any of the before-named offices. Power is also given to the king by his sign manual to appoint any two other persons who are privy councillors to be members of the committee. By s. 2, all appeals or applications in prize suits, and in all other suits or proceedings in the courts of admiralty, or vice-admiralty courts, or any other court in the plantations in America and other his majesty's dominions abroad, which may, by any law, statute, commission, or usage, be made to the high court of admiralty in England, or to the lords commissioners in prize cases, shall be made to his majesty in council; and by s. 3, all appeals or complaints in the nature of appeals whatever which, either by virtue of this act, or of any law, statute, or custom, may be brought before his majesty, or his majesty in council, from or in respect of the determination, sentence, rule, or order of any court, judge, or judicial officer, and all such appeals as are pending and unheard, shall from the passing of this act be referred by his majesty to the said judicial committee of his privy council; and that such appeals, causes, and matters shall be heard by the said judicial committee, and a report or recommendation thereon shall be made to his majesty in council for his decision thereon as heretofore, in the same manner and form as has been heretofore the custom with respect to matters referred by his majesty to the whole of his privy council or a committee thereof, the nature of such report or recommendation being always stated in open court. The judicial committee are authorised to examine witnesses on oath, and to direct issues to be tried by a jury. The judicial committee has the same power of punishing contempts and of compelling appearances, and his majesty in council has the same power of enforcing judgments, decrees, and orders, as are exercised by the high court of chancery or the court of king's bench. A registrar is attached to the judicial committee.

The privileges of a privy councillor, beyond those of mere honorary precedence, formerly related to the security of his person. If any one struck another a blow in the house or presence of a privy councillor, he was fineable. Conspiracy by the king's menial servants against the life of a privy councillor was felony, though nothing were done upon it. By 9 Anne, c. 16, any unlawful

assault by any person on a privy councillor in the execution of his office was felony.

These statutes have, however, been now repealed, by 9 Geo. IV. c. 31, and any offence against a privy councillor stands on the same footing as offences against any other individual.

(1 Co. Lit., 110, a, n. 5; 3 *Inst.*, 182; 4 *Inst.*, 52; 1 Blackstone, *Com.*, 222; Hallam's *Constitutional History.*)

PRIVY SEAL. [SIGNET, SEAL.] The Lord Keeper of the Privy Seal is a member of the Cabinet, and has a salary of 2000*l.* per annum. By an Act of 2 Wm. IV. c. 49, the Commissioners of the Treasury may abolish any of the offices of Clerks of the Signet and Privy Seal when they become vacant, and direct the duties to be performed by the remaining clerks.

PRIZE, property taken from an enemy. The term is generally applied to property taken at sea exclusively. The law of prize is regulated by the law of nations. Sentence of condemnation, that is, sentence that the thing captured is prize, and that consequently the property of its original owner in it is entirely divested, must be pronounced by a court of the capturing power duly constituted according to the law of nations. The prize court of the captor may sit in the territory of an ally, but not in that of a neutral. Questions of prize are by the English law disposed of in the courts of Admiralty. [ADMIRALTY COURTS.]

PRIZE-COURT. [ADMIRALTY COURTS.]

PRIZE-MONEY. All the acts relating to army prize-money have been repealed by 2 & 3 Wm. IV. c. 53, which also enacts that all captures made by the army shall be divided according to such general rule of distribution as the king shall direct. Apprizements and sales of prize and capture are made by agents appointed by the commanders and other commissioned officers. A certified list of the persons entitled to share in the capture is transmitted to Chelsea Hospital by the commanding officer. There is a penalty of 500*l.* for altering names. At the end of three months from the receipt of prize-money, the treasurer of Chelsea Hospital is required to notify in the 'London Gazette' and in two London morning papers that distribution will be made at the end of one month. In this notification the share of an individual in each class must be declared. Shares of prize-money due to a non-commissioned officer or soldier, will be paid only upon personal application, or to his wife, or child, father or mother, brother or sister, or to a regimental agent. If discharged, a certificate must accompany the application, signed by the clergyman and one of the churchwardens or overseers. Personating or falsely assuming the name and character of a person entitled to prize-money with fraudulent intent is punishable with transportation for life, or not less than seven years. By 3 & 4 Vict. c. 65, the Privy Council may refer to the High Court of Admiralty matters concerning booty of war (property captured by land forces). The Prize Court of the Admiralty is the proper court for deciding on matters captured by naval forces.

PROBABILITIES, THEORY OF, a branch of mathematics in which arithmetic is applied to the calculation of chances, in cases in which the data are known. It is impossible, in a work like the present, to give an account either of the mathematical theory, or of the various ways in which our independent judgments are confirmed or opposed by it.

The terms of this theory are well known in connection with games of chance, to which it was originally applied, and for which it was invented. A card being drawn at hazard from a pack, there are 13 ways in which it may be a spade, and 39 ways in which it may not. Hence it is said to be 39 to 13 or 3 to 1 against drawing a spade; and $\frac{3}{4}$ and $\frac{39}{52}$ are made to represent the chances of drawing a spade, and of not drawing one. The justification of this mode of speaking, and the manner in which it connects itself with our ordinary ways of expressing more or less of probability, cannot be entered upon here.

PROBATE AND LEGACY DUTIES. These duties yield a sum exceeding two millions a year. The legacy duty is charged on legacies of the value of 20*l.* and upwards, which are paid out of personal estate or charged upon real estate, and upon every share of residue. Legacy to a husband or wife is exempt from duty. To a child or parent, or any lineal descendant or ancestor of the deceased, the duty is 1*l.* per cent.; to a brother or sister or their descendants, 3*l.* per cent.; to an uncle or aunt or their descendants, 5*l.* per cent.; to a great uncle or great aunt or their descendants, 6*l.* per cent.; to any other relation or any stranger in blood, 10*l.* per cent. The probate duty is payable on the whole value of the personal estate left by the deceased; which personal estate includes leasehold interests in land. No probate duty is paid in respect of freehold interests in land. For sums above 20*l.* and not exceeding 100*l.* the duty is 10*s.* if there is a will; and if there is no will the duty of 10*s.* is chargeable on sums of 20*l.* and not exceeding 50*l.* The duties continue to increase according to a certain scale up to 1,000,000*l.*

PROBLEM (προβλημα) means simply a thing put forward or proposed. In mathematical language it is anything which is required to be done, and in the earlier writers is distinguished from a theorem, or assertion to be proved, in that the latter does not require any specific object to be effected. Thus, '*all the* angles of a triangle are together equal to two right angles' is to be shown or made evident, and is a theorem; but 'to draw a circle through three given points' presents an object to be effected, and is a problem. But it must be remembered that this difference lies more in the nature of the result than in the method; for the solution of this problem, so called, is an intuitive corollary from the theorem that if three points be joined, and perpendiculars be drawn bisecting two of the joining lines, the intersection of these perpendiculars is equidistant from the three points. It is also to be noted that this distinction of theorem and problem appears neither in the Greek of Euclid, Apollonius, nor Archimédes, the general term employed by all three, and in all cases, being προτασις, which is translated by *Proposition.*

PROBUS, MARCUS AURE'LIUS, a native of Sirmium, served early in the Roman army, and was made tribune by the Emperor Valerianus, who had great esteem for him, and recommended him to his son Galliénus. Probus continued to serve with distinction under Galliénus, Claudius II., Aurelianus, and Tacitus. Tacitus, immediately after his exaltation, wrote to Probus, saying that he considered him as the main prop of the state, and at the same time he gave him the command of all the legions in the East. Probus served beyond the Danube against the Quadi and the Sarmatians, in Libya, and in Egypt, where he erected buildings, excavated canals, and made other improvements; he fought against the Palmyrenians under Aurelian, and afterwards served in Gaul. When Tacitus died, six months after his assumption of the empire, his brother Florianus was proclaimed Emperor in the West, whilst Probus was proclaimed in the East; but in less than three months Florianus was put to death by the soldiers, and Probus was acknowledged universal emperor. He was then forty years of age. He encouraged the cultivation of the vine in Gaul and in Pannonia, as well as in Mœsia near Sirmium. An insurrection having broken out in his camp near Sirmium, he took refuge in a tower which he had constructed as a watch-tower, but being followed by the mutineers he was killed, A.D. 282. Vopiscus ('Historia Augusta') has left a high eulogium of Probus. He reigned six years and four months, and was succeeded by Carus.

PROCACCI'NI. This was the name of a family of artists, of whom the eldest was

Ercole Procaccini, born in 1520, at Bologna, where the greater number of his works still exist. The time of his death is uncertain, but he was living in 1591.

Camillo Procaccini, born in 1546, was the eldest son of Ercole. He painted a prodigious number of works in Bologna, Ferrara, Ravenna, Reggio, Piacenza, Parma, and Genoa. He died in 1626.

Giulio Cesare Procaccini, brother of Camillo, the best artist of the family, was born in 1548. He renounced sculpture, in which he had made considerable progress, for painting, which he studied in the school of the Caracci. Of his altar-pieces, that at Santa Afra in Brescia is perhaps most like the style of Correggio. He died in 1626.

Carlo Antonio Procaccini, brother of Camillo and Giulio. He devoted himself to landscape, in which he acquired considerable reputation, as well as by fruit and flowers, which he designed after nature.

Ercole Procaccini, called the Younger, was born in 1596, at Milan. He was the nephew of Giulio Cesare. He painted history and landscapes, but his chief excellence appeared in his flower-pieces. He died in 1676.

PROCESS. This term is sometimes used in its original sense as comprehending the whole of the proceedings which take place, and are recorded by the court, in the course of a suit, criminal or civil, previous to final judgment. In this sense the word (processus, procès), is also used in the French and the Scotch law. In its more ordinary and limited signification the term is applied to the writs which issue out of any court for the purpose of compelling the parties to a suit, and other persons whose co-operation is required, to do some act connected with the progress of the suit. In this sense, also, process is either civil or criminal.

Civil Process was formally, and until lately practically, divided into original, mesne (intermediate), and final process.

Original Process, more commonly known as Original Writs, issued out of the common-law side, or department, of the Court of Chancery. Mesne Process was that which issued between the original writ and final judgment, including writs issued for the purpose of compelling the attendance of jurors and of witnesses, and for other collateral purposes. Final Process comprehends writs of execution. [EXECUTION.]

Mesne and final process are sometimes called judicial process, because they issue under the authority of the judges of the court in which the action is pending.

By 2 Wm. IV., c. 39, it is enacted that, in actions brought in the courts of law at Westminster, the process shall be a writ of summons, in a form prescribed by the statute, which is addressed to the defendant, and requires him to cause an appearance to be entered within eight days from the service of the writ. If the writ be served on the defendant, and he does not enter an appearance, the plaintiff may direct his own attorney to appear for the defendant, and the action proceeds. If the defendant cannot be served with the writ of summons, a writ of distringas may be sued out, by which the sheriff is directed to distrain the defendant by his goods for the purpose of compelling an appearance, and if he still hold out, the plaintiff may cause an appearance to be entered for him.

The act contains a provision for commencing actions where it was intended to have the security of the personal detention of the debtor, by writ of capias, if the defendant were at large, and by writ of detainer, if he were already in custody. But by 1 & 2 Vict., c. 110, arrest upon *mesne* process (as it is called in the statute) is taken away, except in cases where an arrest is ordered by the court or a judge, and all actions must be commenced by summons, though, if the court or a judge order an arrest, a capias may issue in the course of the cause already commenced by writ of summons.

By the operation of these statutes the writ of summons is the only process for commencing *personal* actions in the courts at Westminster. By 3 & 4 Wm. IV., s. 27, s. 36, all actions, real or mixed, except writs of dower, quare impedit, and ejectment, are abolished, which excepted actions may still be commenced by original writ, a term which is commonly limited to an original writ issuing out of chancery; for the writ of summons, though in fact an original writ, is not called so.

Criminal Process.—Where an indictment for treason or felony is found by a grand jury, process of capias issues to the sheriff, commanding him to arrest the indictee. But, where an indict-

ment found, or an information filed, charges the party with a misdemeanor only, the process is at common law a venire facias, being a command to the sheriff to cause the indictee, &c., to come into court, which, under this process, must be done by summoning him. If the indictee, &c., does not obey the summons, and it appears by the return that the indictee, &c., has lands in the county, a writ of distringas issues, commanding the sheriff to compel the indictee to appear, by distraining him by the issues (the produce) of those lands, to appear. If the return to the venire facias shows that the indictee has no lands, process of capias issues. And by 48 Geo. III., c. 58, s. 1, whenever any person is charged with any offence for which he may be prosecuted by indictment or information in the King's Bench, not being treason or felony, and the same shall be made to appear to any judge of the same court by affidavit, or by certificate of an indictment, or of information being filed, against such person in the said court for such offence, such judge may issue his warrant under his hand and seal, and thereby cause such person to be apprehended and brought before him or some other judge of the same court, or before some one justice of the peace, in order to his being bound, with two sufficient sureties, in such sum as the warrant shall express, with condition to appear in the said court at the time mentioned in the warrant, and to answer all indictments or information for any such offence.

Before any indictment is found, a party charged upon oath with treason or felony may be brought before a magistrate by virtue of a warrant issued for his apprehension by the same or some other magistrate of the district, and may by another warrant be committed to prison for trial, if upon the examination there appear to be grounds to suspect that the party is guilty.

PROCESS VERBAL (*Procès-verbal*), a French term which signifies a memorandum or instrument drawn up and attested by officers of justice, containing a statement of the circumstances which have taken place upon the execution of a commission, upon an arrest, upon a precognition or preliminary examination of a party accused, or in the course of other legal investigations, and set forth in the order in which they have occurred. The term is now frequently applied to a contemporaneous detailed minute or note of any formal proceeding, though not occurring in the course of any legal inquiry; for instance, a note of the discussions which are taking place during the negotiation of a treaty.

PRO'CIDA, the ancient Próchyta, an island, about 8 miles in circumference, at the north-west entrance of the Bay of Naples, is generally level, fertile, and well cultivated. The vineyards produce good common wine. The population exceeds 10,000; the men are mostly sailors and fishermen: many of them are engaged in the tunny and coral fisheries. The island contains several villages, a small fort, and a royal country-seat.

PROCLAMATION. By the constitution of England, the king possesses the prerogative of issuing proclamations; for although this authority is exercised by the lord mayor in the city of London, and by the heads of some other corporations in other cities, for certain limited purposes, it is always founded upon custom or charter, and consequently only exists by delegation from the crown.

In some instances proclamations are merely a promulgation of matters of state or of acts of the executive government. Proclamations of the accession of a new king or a demise of the crown, and proclamations for reprisals upon a declaration of war with a foreign state, and for rendering coin current within the realm, are examples of this kind. Another class of proclamations consists of those which declare the intention of the crown to exercise some prerogative or enforce the execution of some law. Thus the king might, by proclamation in the time of war, lay an embargo upon shipping, and order the ports to be shut, by virtue of his ancient prerogative of prohibiting any of his subjects from leaving the realm. [NE EXEAT REGNO.] A breach of the duty imposed or declared by a proclamation of this kind would be punishable, either as a contempt, or as a misdemeanor at common law. Another class of proclamations issued by the crown consists of formal declarations of existing laws and penalties, and of the intention of government to enforce them, designed as some of the early books term it, *quoad terrorem populi*, and merely as admonitory notice for the prevention of offences. A familiar instance of this kind of declaration is the proclamation against vice and immorality appointed to be read at the opening of all courts of quarter sessions.

At present the royal prerogative does not authorise the creation of an offence by proclamation which is not a crime by the law of the land: in the language of Sir Edward Coke (3 'Inst.,' 162), 'Proclamations have only a binding force when they are grounded upon and enforce the laws of the realm.'

PROCLUS, a Neo-Platonist, was born at Constantinople, on the 8th of February, A.D. 412. His parents, who were wealthy people, sent him to Xanthus in Lycia, where he was taught reading, writing, and grammar; thence to Alexandria, where he attended the lectures of all the most eminent teachers of philosophy and mathematics; and finally to Athens, where he became a disciple of Plutarchus and Syrianus, two distinguished philosophers of that school. Proclus was the last rector of the Neo-Platonic School at Athens, and died there, A.D. 485.

The works of Proclus, which are very numerous, consist principally of commentaries on older writers: of these the best known are his commentaries on the 'Timæus' and 'Parménides' of Plato. He wrote also commentaries on Hesiod's 'Works and Days;' on the 'Astrology' of Ptolemæus; and on the first book of Euclid's 'Elements,' in two books. His original works, besides a few hymns of doubtful merit, are a treatise 'On the Sphere,' published by Bainbridge, London, 1520 (which however is mostly taken from Geminus), and 'Eighteen Arguments against the Christians,' in which he endeavours to prove that the world is eternal.

There is an edition of the works of Proclus by Victor Cousin, Paris, 1820–7, 6 vols. 8vo. Part of his works were translated by Thomas Taylor.

PROCO'PIUS, ANTHE'MIUS, by which latter name he is best known in history, a grandson of Anthemius, who was minister of Arcadius and of Theodosius II., was proclaimed Emperor of the West by the nomination of Leo I., Emperor of the East, and with the consent of Ricimer, a chief of Suevian and other barbarian mercenaries in the service of the Empire. As a condition of his consent, Ricimer obtained the hand of the daughter of Anthemius. After a few years Ricimer quarrelled with his father-in-law, and marched against him. The Emperor Leo despatched the patrician Olybrius to Italy to mediate a peace, but Olybrius, being offered the crown by Ricimer, was tempted by the offer and accepted it. Anthemius, though forsaken by most of his followers, made a stout resistance outside of Rome, but he was defeated and killed, A.D. 472, after five years' reign.

PROCO'PIUS was born at Cæsarea in Palestine, about the end of the fifth or beginning of the sixth century. After studying rhetoric in his native country, he went to Constantinople. The Emperor Justin the Elder appointed him assessor to Belisarius, who was sent to the frontiers of Armenia. He accompanied Belisarius in his first war against the Persians (A.D. 530), afterwards in that against the Vandals in Africa (533–5), and lastly against the Goths in Italy (536–9). In the year 538 he assisted Antonina, the wife of Belisarius, in raising troops in Campania, and in sending some by sea to Rome, which was then besieged. On his return to Constantinople, about the year 540, the Emperor Justinian made him a senator. He died at an advanced age, but the precise year of his death is not ascertained.

Procopius wrote in Greek the 'History of his Own Times' in eight books. The work is useful, because it forms a link between the history of Ammianus Marcellinus and the Byzantine historians. His narrative begins with the death of Arcadius, and is continued to the 23rd year of Justinian, A.D. 550. A work of Procopius, on the public buildings erected or restored by Justinian throughout the Empire, contains much valuable information. Another work of Procopius in short chapters, entitled 'Anécdota, or Secret History,' is a scandalous chronicle, in which Justinian and his wife Theodóra are painted in the blackest colours. The author could not speak of these personages in his history as he wished; but he has allowed himself full scope in his Secret History.

PROCTOR, an officer of the Ecclesiastical Courts, whose business is that of an agent or attorney for his clients. It is a shortened form of the Roman term *Procurator*. He stands in a similar situation to that of an attorney at common law or a solicitor in chancery. There are about 120 proctors now practising in the several courts of Doctors Commons, London, which are four in number, the Court of Arches, the Prerogative Court, the Consistory or Consistorial Court of the Bishop of London, and the Admiralty Court. Proctors are also employed in assisting executors to obtain probate of wills, and next of kin, or other persons entitled, to obtain letters of administration. It is also the business of a proctor to obtain licences for marriage, on the application of either of the parties about to contract such marriage.

The proctor in many cases has to attest the acts of his client, and for this purpose he is appointed a notary public, but his power as such extends only to proceedings in his own courts, and not to the general business of a notary. The official title of a proctor is 'notary public, and one of the procurators-general of the Arches Court of Canterbury and of the High Court of Admiralty.'

Attached to courts of the province of York and to the different bishops' courts are similar bodies of proctors, who differ only in trifling circumstances from those here described.

PRO'CULUS, one of the tyrants or pretenders to the Roman Empire, who rose after the death of Tacitus. He was attacked by Probus, defeated, and killed, A.D. 276.

PRO'CULUS, a distinguished Roman jurist, the successor of Nerva the father. He belonged to the school of Labeo, and the followers of that school derived their name Proculiani from him. Proculus is often cited in the 'Digest,' which also contains 37 excerpts from a work of his entitled 'Epistolæ.'

PROCURA'TOR, a Latin word, signifying a manager or agent, whence the word proctor is formed. [PROCTOR.]

PRO'DICUS, a native of Cos, or, as some think, of Chios, flourished B.C. 435. He was a disciple of Protágoras, became a celebrated sophist, and had among his followers Sócrates, Eurípides, Isócrates, and Xénophon. Prodicus travelled through Greece, from town to town, to deliver his lectures. None of the writings of Prodicus are extant, except a beautiful episode, preserved by Xenophon ('Mem.,' ii. 1), usually called 'The Choice of Hercules.' This has been paraphrased in English verse by Shenstone and by Bishop Lowth, and there is a prose translation in the 'Tatler.'

PRODUCT, a term really equivalent to result, but used only when the result is the one obtained by the multiplication of two or more quantities.

PROFANENESS. [BLASPHEMY.]

PROFIT, one of the three parts into which all that is derived from the earth or the water by labour and capital is distributed, the other two parts being wages and rent: from these three sources arise all the revenues of the community. Profit is therefore the surplus which remains to the capitalist after he has been reimbursed for the wages advanced and the capital laid out during the process of production. To obtain this surplus is the only object for which capital is employed.

Profits have a tendency to fall to the same level in all branches of industry; for if the ratio of profit in proportion to the capital employed be greater in one than in another, more capital will be directed to that which affords the highest profit; and the powers of production being increased, the supply is greater, prices fall, and the equilibrium of profit is restored. When the em-

ployment of capital is attended with extraordinary risk, profits are nominally high, but, after deducting the losses to which it is exposed, the real profits tend to the same level as the ordinary rate. The pleasantness of a particular occupation may induce those who pursue it to be content with a low rate of profit. Unless we reduce profits from their apparent to their real value, there is no truth in the maxim that the rate of profit is uniform in the same country at the same time.

The natural tendency of profits (whether arising from capital employed in agriculture or in manufactures) is to decline as the necessities of the population render it necessary to have recourse to inferior soils. Happily, improvements in machinery and in the art of agriculture, better combinations of labour and capital, and greater freedom of commerce, are calculated to arrest this retrograde movement; and to such sources of relief every highly-advanced country must look as a means for sustaining its prosperity; for whatever diminishes the necessity of raising food from the poorer soils, tends to maintain the rate of profit.

The two other causes have great influence upon the rate of profit, namely, wages and taxation. A rise in wages will diminish profits, unless industry becomes more productive; but if production is increased, both may rise at the same time, either in the same or in different proportions, according to circumstances.

Taxation will diminish profits, unless wages fall or industry become more productive. Taxes on profits, when they fall alike upon all capital engaged in productive industry, are paid by the owners of capital, who have not the power of charging the tax upon consumers. The means of accumulation are diminished when the profits of only certain classes of traders are taxed, and they would betake themselves to other occupations not taxed, unless they could charge the consumers with the tax: the tax therefore falls upon the consumers.

PROGNO'SIS (in Medicine) is the opinion formed respecting the probable future events of any disease.

PROGRESSION. A series of numbers following any law should be called a progression, but the word is usually restricted to two sorts of progression, which are called, but by no means correctly, arithmetical and geometrical.

An *Arithmetical Progression* is one in which the terms continually increase or diminish equally, including, as an extreme case, that in which they do not increase nor diminish at all. Thus

7,	7,	7,	7,	&c.	7,	8,	9,	10,	&c.
10,	9½,	9,	8½,	&c.	2,	3½,	4½,	5½,	&c.

Geometrical Progression is when the terms of a series increase or diminish by the use of the same multiplier, whole or fractional, including, as an extreme case, that in which the multiplier is unity. Thus, the multipliers being 1, ⅔, ½, and 2, the four following sets of terms are in geometrical progression:—

7,	7,	7,	7,	&c.	7,	8,	$\frac{64}{7}$,	$\frac{512}{49}$,	&c.
3,	2,	1½,	1,	&c.	9,	18,	36,	72,	&c.

PROHIBITION, a writ to prohibit a court and parties to a cause then depending before it from further proceeding in the cause.

A writ of prohibition may issue from any of the three superior courts of common law at Westminster, and also from each of the common-law courts of Chester and Lancaster. It may be addressed by any of the three superior courts to any other temporal court. It may also be granted by any of the three superior common-law courts to any spiritual court, and by the common-law courts of Chester and Lancaster to the spiritual courts within the county palatine and duchy.

The writ is grantable in all cases where a court entertains matter not within its jurisdiction, or, where, though the matter is within its jurisdiction it attempts to try by rules other than those recognised by the law of England.

If parties proceed after a writ of prohibition has been obtained and served, they are liable to an attachment for contempt.

PROJECTILES, THEORY OF. This subject usually comprehends the investigation of the relations between the space described, the time of motion, and the velocity acquired by a body when impelled in any direction by some motive force.

The circumstances of a body descending from a high place towards the earth by the action of gravity, and those of a body projected vertically upwards from the earth, on the supposition, in both cases, that the body moves in a non-resisting medium, have been noticed in the article FALL OF BODIES; and the circumstances attending the motion, both in a resisting and a non-resisting medium, of a body impelled by fired gunpowder, when the impulse is in a direction parallel or oblique to the horizon, have been investigated in the article GUNNERY.

In most treatises on Dynamics, there are given problems for determining the circumstances of a body ascending and descending in resisting media. For the investigations the reader may consult such works as Poisson's 'Traité de Mécanique,' Hutton's 'Tracts,' &c.

PROKOPHIEV, IVAN PROKOPHIEVITCH, was born at St. Petersburg, Jan. 25, 1758. Having gone through the course of studies at the Academy of Fine Arts, he was sent, in Sept. 1779, to perfect himself under Julien, at Paris, where, in the following year, he executed a bust in marble of Prince Gagarin, and a relief in terra-cotta representing Moses, which last, and a similar one of Morpheus, are in the Academy at St. Petersburg. Having passed a few months at Berlin and Stettin, he returned to St. Petersburg in 1784. He produced an extraordinary number of works, which generally display considerable powers of invention and ability in composition. In the Imperial Library at St. Petersburg there are 16 small caryátides and 28 bas-reliefs by him. He died at St. Petersburg, Feb. 10, 1828.

PROLOGUE (πρόλογος, from πρὸ, *before*, and λόγος, *speech*) is usually applied in English to the short poem or verses which are sometimes prefixed to new plays, to recommend them to the favour of the reader or spectators. In the comedies of Plautus and Terence we find prologues of this

kind. Aristotle ('De Poetic.,' c. 12) gives the name of prologue to that part of the Greek tragedy which precedes the *Párodos*, or first speech of the chorus.

PROME'THEUS. [ÆSCHYLUS.]

PRONGBUCK. [ANTELOPE.]

PRONOUNS, the name given by grammarians to certain words which are used as substitutes for the names of persons and things. Pronouns properly so called are commonly divided into personal, demonstrative, relative, and interrogative; but it appears probable that all pronouns, at least with the exception of the first and second personal pronouns, were originally demonstrative. William Humboldt remarks that the first and second personal pronouns 'are not mere substitutes for the names of the persons for whom they stand, but involve the personality of the speaker and of the person spoken to, and the relation between them;' and in writing and conversation there is frequently hardly any name which can so clearly designate the person intended as the appropriate personal pronoun. The third personal pronoun in English appears to have been originally a demonstrative, and to contain the same root, *ta*, *sa*, or *ha*, which occurs in the demonstrative pronoun in the Latin, Greek, and other cognate languages. The relative pronoun may also be regarded as a demonstrative; for whether the pronoun is used to denote an object pointed out at the time by the speaker, or an object mentioned just before, or one which is to be immediately brought before the hearer's mind, it is equally demonstrative. In the last of these cases the pronoun is called a relative, as 'I saw the man *whom* you mentioned.' In English we have two forms for the relative, *that* and *who* or *which*. The former is the same word as the demonstrative; the latter contains the same root as we find in the Latin *qui*, the Sanscrit, Zend, and Lithuanian *ka*, and the Gothic *hver* and *kva*. The interrogative pronoun is the same as the relative in English and many of the cognate languages, and only differs from the relative in referring to something subsequent and unknown; whereas the latter refers to an antecedent and definite subject.

PRONY, GASPARD CLAIR FRANÇOIS MARIE RICHE DE, was born at Chamelet, in the department of the Rhone, July 22, 1755. His father was a member of the 'parliament,' or chief civil court of the ancient principality of Dombes; and at the College of Thoissey in that principality, Prony received his education, till 1776, when he entered the Ecole des Ponts et Chaussées. Here his assiduity was such as to lead Perronnet to foretell that he would one day occupy his own position, that of head of the establishment. He first became known as an author by an Essay on the 'Thrust of Arches,' published in 1783, about which time he began to be employed, under Perronnet, upon several public works, among which may be mentioned the restoration of the port of Dunkirk (1783), and the erection of the bridge of Louis XVI. at Paris (1787-90), of which last the engineering plan is said to have been drawn up and its execution superintended by Prony.

In 1790, he published the first volume of his 'Hydraulic Architecture.' The second appeared in 1796. Prior to this, the only work of the kind accessible to the engineer was the standard work bearing the same title, by Belidor, published in 1737-53, so that, as Delambre observes, the progress which the theory of mechanics had made in the hands of Euler, D'Alembert, Lagrange, and Laplace, had lain without real application to the arts of construction. Prony's work is perhaps the first of an elementary character in which the directions of forces, and the systems on which they act, are referred to rectangular co-ordinate axes.

Among other scientific projects of the French revolutionary government at this period, was that, suggested by Carnot and others, of computing a set of mathematical tables, by which it was supposed two objects would be attained:—the application of the decimal division of moneys, weights, and measures, then recently introduced, would be facilitated; and the world astonished by the 'most vast and imposing monument of calculation which had ever been executed or even conceived.' The direction of this laborious undertaking was confided to Prony in 1792 (year ii.), and with him were associated three or four of the principal mathematicians of Paris, including Legendre. The whole of the calculations, which, to secure greater accuracy, were performed in duplicate, and the two MSS. subsequently collated with care, were completed in the short space of two years. They occupy seventeen enormous folios, and consist of—1, An introduction, containing the analytical formulæ and the mode of using the tables; 2, 10,000 natural sines to 25 places of decimals, with seven and eight columns of differences; 3, The logarithms of 100,000 sines to 14 places of decimals and 5 columns of differences; 4, The logarithms of the ratios of the first 5000 sines to their corresponding arcs to 14 decimal places; 5, A similar table of the ratios of the tangents to their arcs; 6, The logarithms of 100,000 tangents; 7, The logarithms of numbers from 1 to 100,000 to 19 decimal places, and from 100 to 200,000 to 14 decimal places, with 5 columns of differences. The great 'Tables du Cadastre' are still confined, in manuscript, to the library of the Paris Observatory.

Prony was appointed professor of mechanics to the Ecole Polytechnique in 1794, the year of its institution, and the same year he became Directeur-Général des Ponts et Chaussées. As professor to the Ecole Polytechnique he was indefatigable in endeavouring to bring the researches of modern mathematicians within the comprehension of his pupils. This was the object of his 'Mécanique Philosophique,' Paris, 1800, 4to.

In 1798 Napoleon invited him to become a member of the Institute of Egypt, which however he declined, and his refusal was never entirely forgotten or pardoned. Nevertheless, after Napoleon's coronation as King of Italy (1805), Prony was charged with the engineering operations for protecting the province of Ferrara from the further inundations of the Po; and about the same time, or earlier, he was employed in super-

intending the works then carried on by the French government in the ports of Genoa, Ancona, Pola, and in the Gulf of Spezzia, including some very intricate investigations connected with the tides, currents, and deposits of the Adriatic and canals within the Venetian territory. Napoleon's animosity towards Prony appears to have been counteracted only by a regard for his abilities. In 1810 he was appointed (in conjunction with Count Fossombrone of Florence) chief of the Commissione de l'Agro Romano, which had for its object the more effectual drainage and improvement of the Pomptine Marshes. The results of his labours in this very important task, which he prosecuted with extraordinary zeal and success, were embodied in his 'Description Historique et Hydrographique des Marais Pontins,' which appeared in 1823.

After the Restoration he continued to be employed in various important works, among which was the formation of extensive embankments near the mouth of the Rhone. In 1817 he became a member of the Bureau de Longitude; the following year he was elected one of the fifty foreign members of the Royal Society, London; in 1828 he was created a baron by Charles X.; and in 1835 a peer of France. He died at Asnières, near Paris, July 29, 1839.

Prony's published works are very numerous, and treat on a great variety of subjects in mathematics, mechanics, and civil engineering.

(*Discours prononcé par M. Arago, le 3 Août*, 1839, *sur la tombe de M. de Prony*, given in the *Annuaire* for 1840.; *Biographie des Contemporains; Edinburgh Journal of Science*, vol. xv; Querard's *Dictionnaire Bibliographique; The Works of Prony*, &c.)

PROPE'RTIUS, SE'XTUS AURE'LIUS, a native of Mevania in Umbria, was probably born about 56 B.C. His family was of equestrian rank, and when, after the campaign of Philippi, Augustus rewarded his veterans with assignments of lands, the family of Propertius was, like many others who had supported the cause of M. Antonius, deprived of their estates. About this time, or soon afterwards, young Propertius went to Rome, where he devoted himself entirely to poetry. In Rome he soon attracted the attention and gained the friendship of contemporary poets, such as Ovid, who always speaks of him with fondness. He also enjoyed the patronage of Mæcenas, and lived on the Esquiline, perhaps in the gardens of his patron himself.

It is not known when Propertius died, but probably he did not attain beyond the middle period of life.

Callimachus was one of the models of Propertius. Four books of his elegies are extant. In the first three books he sings of his beloved Cynthia; the fourth is chiefly occupied with heroic and religious legends, in which the poet displays his learning. His style is artificial, and his writings are often obscure. The Romans however ranked him high as a poet.

There is an edition of Propertius, with a commentary by Broukhusius, Amsterdam, 4to., 1702. The most complete edition is that of P. Burmann, 1780. Recent German editions have done something towards establishing a more correct text. In 1782 was published in London, 'The Book of the Elegiacs of Propertius, entitled Cynthia, translated into English Verse, with Classical Notes,' &c.

PROPERTY is derived, probably through the French language, from the Latin word *Proprietas*, which is used by Gaius (ii. 89) as equivalent to ownership (dominium). The etymology of the word proprietas (proprius) suggests the notion of a thing being a man's own, which general notion is contained in every definition of property. A foreign writer defines ownership or property to be 'the right to deal with a corporeal thing according to a man's pleasure, and to the exclusion of all other persons.'

The definition excludes incorporeal things, which however are considered objects of property in our law, and were also considered as objects of property in the Roman law, under the general name of jura or jura in re. This definition also describes property as consisting in a right, by which word right is meant 'a legal power to operate on a thing, by which it is essentially distinguished from the mere possession of the thing, or the physical power to operate upon it. Consequently such a right is not established by the possession of the thing; and it is not lost when the possession of a thing is lost. Such a right can also be enforced by him who possesses the right by an actio in rem against every person who possesses the thing, or disputes his right to it.' (Mackeldey, 'Lehrbuch des heutigen Röm. Rechts,' ii. p. 1—36.) This definition may be adopted, with this limitation, that to deal with a corporeal thing according to a man's pleasure, must not be such a dealing as will prevent other people from dealing with their property at their pleasure. The extent of this limitation is very indefinite; but such a limitation must be admitted as necessary. A man may destroy his own property if he likes, but the destruction must not be in such manner as to destroy any other man's property. By property then is here understood that which the positive law of a country recognises as property, and for the protection or recovery of which it gives a remedy by legal forms against every person who invades the property, or has the possession of it.

The term Property in a thing or of a thing signifies the most complete right which the law of any country gives to a man in or to a corporeal thing. If one man has a life estate in land, and another has a vested interest in the remainder or reversion, the remainder-man, or the reversioner, is the real owner, or has the property: the other has only a right to the enjoyment of it limited by the measure of his life, or some other person's life or persons' lives; and his enjoyment of this life interest is also limited by the very nature of the interest, for he must not so use the thing as to destroy it or deteriorate it beyond the amount of deterioration that may be inseparable from enjoyment or use. The degree in which the life-holder's enjoyment may be limited will depend on the positive law of each country.

Yet limited interests in a thing are often comprehended under the term Property; and when

we wish to express all that a man is worth, all that is capable of an appreciation in money, we speak of his 'all' as all a man's 'property.'

A complete view of property, as recognised by any given system of law, would embrace the following heads, which it would be necessary to exhaust, in order that the view should be complete. It would embrace an enumeration of all the kinds or classes of things which are objects of property: the exposition of the greatest amount of power over such things as are objects of property, which a man can legally exercise; and, connected with this, the different interests which persons may have in a thing which is an object of property: the modes in which property is legally transferred from one person to another, or acquired and lost; the capacity of particular classes of persons to acquire and transfer property as above understood, or, to take the other view of this division, an enumeration of persons who labour under legal incapacities as to the acquisition and loss of property.

The general division of property in the English law is into Things Real and Things Personal, the incidents to which are in many respects different in the system of English law. Things Real are comprehended under the terms Lands, Tenements, and Hereditaments.

It has been said that the distinction between legal and beneficial or equitable property is peculiar to the English law (Lord Mansfield, 1 'T. R.,' 759, n.). But these two kinds of property existed in the Roman law, and the theory of the division of ownership or property into quiritarian or legal, and bonitarian, beneficial, or equitable, was fully developed. Its origin in the Roman law is not certain; but it is a probable conjecture that its origin so far resembled the origin of the like division in English law, that it was due to the attempt to get rid of the difficulties attending the alienation of property by the old legal forms. (Gaius, ii. 40.)

Personal Property, as understood by the English law, is not sufficiently described by the term 'movables,' for certain estate in land are personal property, and are comprehended under the term of Chattels Real. [CHATTELS.] Terms for years are an example of chattels real; and they pass together with the rest of a man's personal estate to the executor.

A quantity of stock in the public funds is not money, though often talked of as such, but still it is property in a sense; for it is a legal right to a perpetual annuity paid by the State, and it is a thing that can be bought and sold. Even debts due to a testator or intestate are considered as property with respect to probate and letters of administration. Yet they are not expressed by the term goods and chattels in the letters of administration, but by the term 'credits;' for as debts are not the property of a man to whom they are due until he gets them, so they cannot become property simply because he happens to die.

Property in Chattels may, like property in Things Real, vary as to quantity and quality of interest, though things personal are not capable of such extended and various modifications, analogous to Estates, as things real are. As to quantity, that is duration, a man may have the use of a personal thing for life, and another may have the property in it and the enjoyment after his death. Persons may own a thing either real or personal as joint tenants and as tenants in common.

Property in a thing must not be confounded with a faculty or power to dispose of the thing in certain ways. A man may have a power to do a certain act with reference to property, without having any property in the thing; or he may have a property in the thing of a limited quantity, and also a power to dispose of the thing in a certain way. Thus a tenant for life, who has only a limited property in land, may have a power given to him to make leases, subject to certain conditions, of the property of which he is tenant for life; and other powers.

The property which is called Copyright or Patent is not strictly property. It consists in a power to do certain acts, as to produce and sell a certain work or print or machine; and the power or faculty is made effective by the duty imposed on everybody else of abstaining from making and selling such things. The things that are produced by virtue of such a power are objects of property, but the copyright or patent right is merely a power or faculty which is given exclusively to a determinate person or persons for a determinate time. This faculty is called property, because it is a thing that is capable of a money value.

The notion of property is universal, though the particular rules as to property vary in different countries. Society rests on two things chiefly, marriage and the notion of property. The notion of marriage varies in different countries, but there is perhaps no set of people among whom it does not exist in some form. It is the foundation of the notion of a family, an essential element of a State. Fixed rules for the acquisition and maintenance of property are essential to the existence of society; and this is true, whether people choose to keep their acquisitions separate, or to blend them in any common stock, in any possible and practicable kind of association.

PROPHECY (*προφητεία*, a foretelling, or the power of foretelling), in its popular acceptation is a foretelling, or a thing foretold. It may however be more correctly defined a speaking by inspiration, whether the things spoken relate to the present, the past, or the future; but it must be observed that this definition assumes inspiration as an historical fact.

In classical Greek, *prophétes* (*προφήτης*) corresponds with the Latin *vates*, which indeed may be regarded as the same word without the preposition. Thus St. Paul uses *prophetes* ('Tit.' i. 12), which is rendered 'prophet' in the authorised version, but 'poet' by Tyndale; and probably Epiménides is meant. In 'Exod.' vii. 1, God says to Moses, 'I have made thee a god to Pharaoh, and Aaron thy brother shall be thy prophet,' *i.e.* interpreter; or, as it is expressed (iv. 16), 'He shall be to thee instead of a mouth.' Abraham is called a prophet ('Gen.' xx. 7), *i.e.* an intercessor between God and man. In the New Testament, prophesying is

several times used in the sense of interpreting the hard places of the Old Testament. Some of the Jewish prophets were particularly distinguished as writers, and their instructions mingled with predictions (called by the general title of prophecies) were added to the other sacred books, and became of canonical authority. These prophets thus carried on, enlarged, and spiritualised the code which had originally been given by Moses; and they probably handed down through each generation certain doctrines made known to the patriarchs, which the law was not designed to unfold.

Numerous oracular answers, that is prophecies, or predictions, of the oracle of Delphi, are recorded in the Greek writers; but these are very different in their character from those recorded in the Bible. Some of these were extant in books written long before the events took place to which they refer, such as the prophecy concerning Abraham's posterity, their extraordinary increase, their sufferings in Egypt for four hundred years, their sojourning in the wilderness, and their possessing at length the land of Canaan, and many others. The numerous prophecies in the Old Testament pertaining to the Messiah, with their accomplishment recorded in the New Testament, and the prophecies of Jesus and his Apostles, are too well known to need to be specified. The prophecies of the Old and New Testament, which have been long fulfilled, afford altogether an amount of evidence which, if really understood, it seems impossible to resist, in proof of the Bible being a revelation from God.

The prophecies of the Old and New Testament are understood by all believers in scriptural prophecy to be predictions of future events pronounced by persons who were directed and governed by the Deity. The first thing to establish is the genuineness of the books in which they are contained. The question is, whether the prophecies in the form in which we have them were delivered before the events to which it is alleged that they refer. This is a matter of historical criticism, and in no respect differs in the mode of investigation, from an inquiry of a like kind as to any other book. The next inquiry is to compare the alleged prophecy with the events of which it is alleged that it was a prediction. This, though apparently the easier part of the inquiry, is one wherein much difference of opinion may exist. Some of the prophecies are clear and precise in their terms; and when the former part of the inquiry has had a satisfactory result, no unprejudiced person can doubt that the prophecies do refer to certain definite events. Some of the prophecies are in their terms vague and general, and others refer to events which, it is admitted, have not yet been accomplished. So far as it is admitted that any prophecy has not been accomplished, so far it must be admitted that prophecy fails in being substantiated by the only evidence that can establish its truth. It is then on those events which all believers allege to be events accomplished, in conformity to genuine predictions, that the proof of prophecy depends. The method of investigation is that which has been already mentioned, and every man should come to it with an unprejudiced mind.

PROPITHE'CUS, Mr. Bennett's name for a genus of Lemurine animals, founded on a species obtained from Madagascar, and described in the 'Zool. Proceedings,' 1832. Habits unknown, but doubtless arboreal. [LEMURIDÆ.]

PROPOLIS. [BEE.]

PROPORTION. There must be in the mind of every person, antecedently to all mathematical instruction, a perfect conception of proportion, though not perhaps of the manner of measuring magnitudes with a view to express their proportions by means of numbers. All who can trace the resemblance of a drawing to the original, or have the least notion of the use of a map, are in possession of the fundamental notions on which a theory of proportion can be founded. The ratio or relative magnitude of two magnitudes is to be measured by the number of times or parts of times which one is contained in the other.

If all magnitudes of the same kind were necessarily commensurable, that is, if any one among them being taken as a unit, the rest were all expressible by multiples, aliquot parts or submultiples, and multiples of aliquot parts, of the unit chosen, no difficulty would arise in making the subject of proportion purely arithmetical. For let a and b represent the units, parts of units, or both, in two magnitudes of the same kind (as two lines); any sufficient demonstration of the rule for the division of one fraction by another will show that a contains b precisely a number of times and parts of times. If then we say that a is to b in the same proportion as c to d, we mean that a contains b precisely such times and parts of times as c contains d, that is, we assert the equation

$$\frac{a}{b} = \frac{c}{d};$$

the mathematical treatment of which is so easy, that no one who can solve a simple equation can be stopped for a moment by the difficulty of any consequence of it.

In measuring magnitudes of which the numerical representatives are afterwards to be submitted to calculation, it necessarily follows, from the imperfections of our senses, that some imperceptible amount of magnitude must always be neglected or added; so that, for example, that which we call a line of 3 inches long means something between 2.9 and 3.1, or 2.99 and 3.01, or 2.999 and 3.001, according to the degree of accuracy of the measurement. All magnitudes therefore are practically commensurable; for suppose, in the case of weights for example, that a grain is taken as the unit, and that the ten-thousandth part of a unit is considered as of no consequence; then by taking every weight only to the nearest ten-thousandth of a grain, they may every one be expressed arithmetically with a conventional degree of precision, which for every purpose of application will do as though it were perfectly accurate.

The discovery of incommensurable magnitudes, one of the most striking triumphs of reason over the imperfection of the senses, was made at a very early period; since the demonstration of their existence, the classification (to a certain extent) of their species, and the means of overcoming the

difficulties which they present, appear in the writings of Euclid. A moment's consideration will show that a property of numbers, a relation of figure in geometry, a general law of nature, may be inferred from induction with a degree of probability which will amount to moral certainty, both as to the exactness and universality of the property, relation, or law. But the existence of incommensurable magnitudes can never be made certain, except by absolute deduction: no attempt at measurement, a *minimum visibile* existing, could show the non-existence of any common measure, however small. Suppose for instance that, having provided means of measurement which can always be depended on to show the thousandth of an inch, but nothing less, a person should accurately (as the word is commonly used) lay down squares of one, two, &c., inches in the side, with a view to render the existence of a common measure to the side and diagonal exceedingly improbable by experiment. If not before, he would be baffled by the square whose side is 2378 inches, the diagonal of which could not by his measures be distinguished from 3363 inches, from which it differs only by about the five-thousandth part of an inch. And let any greater degree of exactness be attained in the means of measurement, short of positive accuracy, a reasoner on the subject could still predict a square which should defeat the object sought to be attained.

The mere existence of incommensurables, to say nothing of their frequent occurrence, and the impossibility of avoiding them, renders the arithmetical theory of proportion inexact in its very definition. If we would say, for instance, that the diagonal of a larger square is to its side as the diagonal of a smaller square is to its side, we enunciate a proposition the meaning of which is unsettled. For if we mean to assert that the larger diagonal contains the larger side as many times or fractions of times as the smaller diagonal contains the smaller, it is answered, by those who wish for precise notions, that neither diagonal contains its side any exact number of times or parts of times. If we should say that the larger diagonal lies between 1.414213 and 1.414214 times the larger side, and that the smaller diagonal also lies between 1.414213 and 1.414214 times the smaller side, and if we should show this to be true, we certainly show that we could produce lines very nearly equal to the diagonals, which are, under the arithmetical definition, proportional to the sides; and that this might be done without altering either diagonal by so much as the millionth part of the side. And the ten-millionth, hundred-millionth, or any aliquot part of the side, however small, might be substituted for the millionth, without detriment to our power of showing the truth of the proposition. If we use the means by which this process may be carried on *ad infinitum*, we may perhaps be said to have established the truth of the proposition that the diagonals of squares are as their sides. But if we in any manner stop short of this, we destroy the rigorous character of geometry, and produce a system of mathematics which, like a common table of logarithms, is true to a certain number of places of decimals, and not farther. It is obvious that such a system of mathematics, like the table with which we have compared it, is sufficient for the purposes of practical application; nor have we the least quarrel with those who, desiring an instrument only, take one which is sharp enough for their purpose. We only complain of them when they assert and teach others that their tool has an edge keen enough to separate the minutest truth from the minutest falsehood; whereas, on examining it with a powerful microscope, we find the so-called sharp edge capable of being magnified into a plane of any dimensions, though it may appear a sharp edge to the unassisted senses.

The imperfection of the arithmetical definition of proportion is universally admitted, while the complexity of the rigorous definition by which Euclid supplied its place is almost as universally felt to be a grievance. Many attempts have been made to avoid the trouble without incurring the reproach of inaccuracy.

The definition of proportional quantities given by Euclid is as follows:—'Magnitudes are said to have the same ratio to one another, the first to the second, and the third to the fourth, when equimultiples of the first and third, and equimultiples of the second and fourth, whatever the multiplications may be, yield a multiple of the first, greater than, equal to, or less than, that of the second, according as the multiple of the third is greater than, equal to, or less than, that of the fourth.' That is, if A, B, C, and D be the four magnitudes, and m and n any two whole numbers whatsoever, mA must be greater than, equal to, or less than nB, according as mC is greater than, equal to, or less than nD. Otherwise thus, whatever whole numbers m and n may be, A must exceed, equal, or fall short of n-ths of B, according as C exceeds, equals, or falls short of n-ths of D. A person practised in algebra would comprehend the definition most easily when stated thus: mA—nB must have the same sign as mC—nD, for all whole values of m and n.

This definition equally applies whether A and B be commensurable or incommensurable, since no attempt is made to measure B by an aliquot part of A.

PROPORTION, *in Music, is either* Harmonical or Rhythmical.

Harmonical Proportion is when, of three numbers representing the relations of sounds, the first has the same proportion to the third as the difference between the first and second has to the difference between the second and third; as in the numbers 6, 8, 12. When four numbers are in Harmonical Proportion, then the first has the same proportion to the fourth as the difference between the first and second has to the difference between the third and fourth; as in the numbers 6, 8, 12, 18. [Acoustics; Diatonic; Scale.]

Rhythmical Proportion is the proportion, in relation to time or measure, between the notes representing duration. Thus, the semibreve to the minim is 2 : 1; the semibreve to the crotchet, 4 : 1; the minim to the semiquaver, 8 : 1; &c.

PROPORTIONAL PARTS, a name given

in logarithmic and other tables to small tables which are annexed to the differences of the tabular number, and which consist merely in setting down the several tenths of the differences or the nearest whole numbers to them. Thus, in the case of 953, the table of proportional parts is as follows:

	953
1	95
2	191
3	286
4	381
5	477
6	572
7	667
8	765
9	858

Thus, 286 is the whole number nearest to 3-tenths of 953; from which we infer that 29 is the whole number nearest to 3-hundredths of 953. If then we would have ·74 of 953 to the nearest whole number, we take

7 tenths . . .	667
4 hundredths . .	38
	705

or 705 is the nearest whole number required, subject to the possibility of an error of a unit, which is of no consequence in the matters for which such tables are used. This is the process required in logarithmic interpolation, when tables of seven decimal places are used.

PROPYLÆUM (προπύλαιον), signifying literally a fore-portal or one detached from and placed in advance of the building to which it gave access, is used as a distinctive term for the structures through which was the entrance into the inclosure surrounding some of the Grecian temples.

The general arrangement and character of a Greek propylæum may be best explained by a description of the propylæum of the Acropolis. This was of the Doric order, and hexastyle on both fronts; and the outer front was greatly extended by two flanking wings projecting forward at right angles, so as to inclose the platform to which an ascent of steps led up from below, and above which the portico and the two lesser colonnades forming the sides of the wings were raised upon three other steps. Thus the platform (78 feet from north to south, by 40 east and west) became an elevated open fore-court, presenting a principal portico in front crowned by a pediment, and two colonnades, which being considerably lower (their columns 19 feet, the others 28½ feet high) gave greater importance to the former; and a degree of scenic effect, combination, contrast, and variety, was produced, very unusual in Grecian architecture, and which must originally have been very striking when the lower flight of steps existed of which however there now exists no trace.

As partaking of the ancient Greek propylæum character, we may mention the London Terminus of the London and Birmingham Railway, in Euston Square. It differs however from the ancient ones in being entirely open, and without any internal transverse wall.

PROROGATION. [PARLIAMENT.]

PROSE comprehends any species of composition which is not written in metre. [POETRY.]

PRO'SELYTE (προσήλυτος). This word is not found in classical Greek, but occurs many times in the Septuagint, and a few times in the New Testament. The word is applied almost exclusively to persons converted to the religion of the Jews. In modern times the word is used in a more general sense.

PROSE'RPINA, called by the Greeks Perséphone, was the daughter of Zeus and Deméter. She was carried off by Pluto while gathering flowers in the Nysian plain, and made the queen of the dead. The story is told in the Homeric Hymn to Deméter, by Ovid, and by Claudian.

PRO'SODY (προσῳδία) is derived from a Greek word, which has exactly the same meaning as the Latin *accentus*, and was used by the Greeks in the same sense. Most modern writers however make a distinction between prosody and accent, understanding by the former what is usually called *quantity*, that is, the duration of a sound. Thus it is said that the principle of Greek and Roman versification is *quantity*, while that of the poetry of the modern European languages depends on *accents*. It is not however improbable that what the ancients meant by *quantity* was not very different from what we call *accent*. For further information on this subject the reader is referred to an article in the fourth volume of the 'Journal of Education,' p. 337, &c.

PRO'SOPIS, a name which occurs in Dioscorides, and which has been injudiciously applied to a tropical genus, without any proof of the species of this having any resemblance to the original plant. The genus consists of trees or shrubs. One species is found in India, which resembles the South American species in its legume, when ripe, containing, besides the seeds, a large quantity of a brown mealy substance, which is eaten by the natives of the country.

PROSZNITZ. [MORAVIA.]

PROTA'GORAS was born at Abdéra in Thrace, and is said to have been originally a porter, and to have received instruction from Demócritus, who was however probably younger than his pupil. Demócritus was born B.C. 460, but the time of the birth of Protagoras is not exactly ascertained. His death may have taken place before B.C. 406. Protagoras visited Athens at least twice, and his second visit was made between B.C. 423 and 421. He travelled about to give instruction in philosophy and eloquence. Indeed he is said to have been the first who taught oratory as an art; and the first who adopted the name of Sophist. He received money for his instruction, and, according to Plato ('Meno.' c. 29, p. 91), he grew rich. None of his writings are extant, through he wrote several works. In Plato's dialogue intitled 'Protagoras,' there is an amusing account of the enthusiasm with which he was received by the young men of Athens.

PROTEIN, a substance obtained by Mulder

from albumen, casein, horn, and animal and vegetable fibrin. When any one of these is dissolved in a solution of potash, and the filtered solution is mixed with a slight excess of acid, a copious grayish-white flocculent precipitate is formed, and a slight smell of hydrosulphuric acid is perceived. This white substance is *Protein*, so called from its occupying the first or most important place in relation to the albuminous principles.

Protein possesses neither smell nor taste, attracts moisture rapidly from the air, and loses water at 212°. It is insoluble in water, alcohol, æther, and essential oils. By long continued boiling in water it undergoes some change of properties, and is rendered soluble.

When strongly heated, protein is decomposed with the production of ammonia and a charcoal which burns with difficulty, but leaves no residue.

Protein consists entirely of carbon, hydrogen, nitrogen, and oxygen; and whether obtained from albumen, casein, horn, animal fibrin, or vegetable fibrin, its composition differs so slightly as to show that it must be the same from whichsoever of these sources it is procured. Analysis:—

Carbon . .	55·30
Hydrogen . .	6.94
Nitrogen . .	16.02
Oxygen . .	21.34

This analysis may be represented by C^{40} H^{31} N^{5} O^{12}.

PROTEST. [Bill of Exchange; Notary.]

PROTESTANT, a general term comprehending all those who profess Christianity, and are not in the communion of the Church of Rome. There is a great variety of opinion among the persons thus separated, in points of faith, church order, and discipline, but this term comprehends them all.

The term originated in Germany. At the diet at Spire, in 1526, decrees had been passed which were so far favourable to the progress of the Reformation that they forbade any peculiar measures against it. The consequence was that the spirit of reformation gained strength, and spread itself more extensively in Germany. Then arose also commotions which were attributed to the reformed and to the spirit kindled by them. Both the pope and the emperor looked with increasing alarm on the aspect of affairs; and at another diet, held at the same place in 1529, the emperor directed an imperial brief to the persons assembled, to the effect that he had forbidden all innovation, and proscribed the innovators in matters of religion, who had notwithstanding increased since the decrees of 1526, but that now, by virtue of the full powers inherent in him, he annulled those decrees as contrary to his intentions. The peremptory tone of these letters alarmed the persons who were present at the diet.

This strong measure of the emperor had also the effect of uniting, at least on this point, the two great sections of the German reformers, the Lutherans and the Sacramentarians, of whom Zuinglius was the head. However, the party opposed to the Reformation was the stronger, and the emperor's brief received the sanction of the diet. Upon this the reformers declared that this was not a business of policy or temporal interests, with respect to which they were ready to submit to the will of the majority, but it affected the interests of conscience and futurity. On this and other grounds they founded a *Protest*, which was delivered in on the 13th day of April, but refused by the rest of the diet. A second protest, larger than the former, was presented on the succeeding day. The princes and the cities who favoured the Reformation joined in it, and thenceforth it became usual to call the reformers *Protestants*.

PROTEUS, Laurenti's name for one of the genera of *Perennibranchiate Batrachians*, namely, those *Batrachians* which preserve their branchiæ throughout life, whereas the *Caducibranchiate Batrachians* only possess them during their early or tadpole state. [Frogs.] This preservation of the branchiæ does not interfere with the presence of true lungs, so that these *Perennibranchiata* may, as Cuvier observes, be regarded as the sole vertebrated animals that are truly amphibious. The same distinguished comparative anatomist says: 'The simultaneous existence and action of branchial tufts and lungs in these animals can no more be contested than the most certain facts of natural history. I have before me the lungs of a Siren of three feet in length, where the vascular apparatus is as much developed and as complicated as in any reptile; nevertheless this Siren had its branchiæ as complete as the others.' [Siren.]

The genera of these *Amphibia*, or *Proteidea*, as they have been termed, are the *Axolotls* [Axolotl]; *Menobranchus* [Necturus]; *Proteus*; and Siren. [Siren.]

Only one species of Proteus appear to be known, the *Proteus anguinus* of authors, *Hypochton Anguinus*. Cuvier describes it as more than a foot long, of the size of a human finger, with a tail vertically compressed, and four little legs; the muzzle elongated and depressed; both of its jaws furnished with teeth; the tongue with but little motion, but free in front; the eyes excessively small and hidden by the skin, as in the Rat-Mole (*Spalax*); the ears covered by the flesh, as in the Salamander; the skin smooth and whitish.

Those which we have seen alive have been of a light flesh-colour with coral-red branchiæ.

Locality, the deep subterranean waters in the caverns of Carniola, Sittich, &c.

(Sir H. Davy's *Consolations of Travel; Proceeds. Zool. Soc.*, 1837; and Prof. Owen on *Lepidosiren* in *Linn. Trans.*, vol. xxviii.) [See also Protopterus.]

PROTO'GENES (Πρωτογένης), one of the most celebrated of the Greek painters, was born at Caunus in Caria. He was a contemporary of Apelles, and was at the height of his reputation in the 112th Olympiad, about B.C. 332. (Plin. 'Hist. Nat.' xxxv. 36, s. 10.) He lived at Rhodes during the greater part of his life.

Of all the paintings of Protogenes the most celebrated was the one called Ialysus, upon which he is said to have been engaged seven years. The fame of this painting was so great, that Demetrius Poliorcétes, when besieging Rhodes, did not set fire to that part of the city where Protogenes

lived, lest he should destroy the picture. (Plin., 'Hist. Nat.,' vii. 39; xxxv. 36, s. 20.) Among other paintings of Protogenes mentioned by Pliny was a portrait of the mother of Aristotle, who advised him to paint some of the exploits of Alexander the Great. Paintings of Alexander and of Pan were among the last of his works. Pausanias (i. 3, s. 4) also mentions a painting of the Thesmóthetæ by Protogenes, which was preserved at Athens in the senate-house (*βουλευτήριον*) of the Five Hundred.

Suidas says that Protogenes wrote two books on the art of painting and on figures.

PROTOPTERUS. Under this name Professor Owen, in the MS. catalogue of the Museum of the College of Surgeons, in June, 1837, recorded the principal characters of an extraordinary animal which he supposed to belong to the Malacopterygious fishes. In the same year, Dr. Natterer published an account of a nearly allied animal under the name *Lepidosiren paradoxa*. This account appeared in the annals of the Museum of Vienna, and is drawn up from two specimens discovered by the author of the paper in South America. The memoir of Dr. Natterer on the South American *Lepidosiren* was followed by one from Professor Owen, in the 'Linnean Transactions' (vol. xviii., part 2, p. 327), in which that anatomist describes in detail both the external characters and internal anatomy of the Protopterus above mentioned; and as he found this animal must be referred to the same genus as that discovered by Dr. Natterer, he adopted his generic term, and applied the name of *Lepidosiren annectens* to the species. The last-mentioned animal, says Professor Owen, 'was presented to the Royal College of Surgeons, June, 1837, by Thomas C. B. Weir, Esq., together with a smaller dried specimen enclosed in indurated clay baked hard by the sun. Several species of insects peculiar to the Gambia, or African forms, accompanied these specimens.' 'It is a female, with the ovaria well developed, and measures twelve inches eight lines in length; its greatest circumference is four inches and a half. The head commences by an obtuse muzzle, and gradually enlarges in all its dimensions to the gill-openings, which are situated immediately anterior to the base of the pectoral extremities: the length of the head, from the snout to the gill-opening, is 1 inch 11 lines.

Our limits will not admit of our following Professor Owen through the various peculiarities of the anatomy of this anomalous animal, which has been regarded by some naturalists as one of the Amphibia. In many points of its structure it certainly does approach that group of animals, especially in the condition of its air-bladder or lungs, and its branchiæ; but as regards the former we find considerable advances are made towards the reptilian structure by some other fishes; and it may be remarked that the present animal still differs widely from the *Amphibia* in possessing distinct large scales. There is another character which it appears is of the highest importance in determining the class to which the *Lepidosiren* belongs, namely, the structure of the nostrils. 'In the organ of smell,' says our author, 'we have at least a character which is absolute in reference to the distinction of fishes from reptiles. In every fish it is a short sac communicating only with the external surface; in every reptile it is a canal with both an external and an internal opening. According to this test, the *Lepidosiren* is a fish; by its nose it is known not to be a reptile; in other words, it may be said that the *Lepidosiren* is proved to be a fish, not by its gills, nor by its air-bladders, not by its spiral intestine, not by its unossified skeleton, not by its generative apparatus, nor its extremities, nor its skin, nor its eyes, nor its ears, but simply by its nose; so that at the close of our analysis we arrive at this very unexpected result, that a reptile is not characterised by its lungs, nor a fish by its gills, but that the only unexceptionable distinction is afforded by the organ of smell.' 'Yet it must be confessed that the physiological consequences of the modifications of the nasal cavity above alluded to, would have been far too insignificant to have established the ichthyic nature of the *Lepidosiren*, if, with coexisting gills and lungs, the modification of the other organic systems had agreed with those of the *Perennibranchians* instead of with those of fishes.'

In conclusion the author states, 'From every group of fishes however the *Lepidosiren* is sufficiently distinct to form a type not merely of a genus, but of a family; and in the natural system it forms a link connecting the higher cartilaginous fishes with the Sauroid genera *Polypterous* and *Lepidosteus;* and at the same time makes the nearest approach in the class of fishes to the Perennibranchiate reptiles.'

The South American *Lepidosiren* (*L. paradoxa*) greatly resembles the species above described, but differs sowewhat in its proportions. The whole length of *L. paradoxa* includes eleven lengths of the head, measured from the end of the mouth to the gill-openings; in the *L. annectens* the total length of the animal includes little more than six lengths of the head. This species is therefore distinguished from the *L. paradoxa* by the shorter relative length of the trunk as compared with the head.

One of Dr. Natterer's specimens of *Lepidosiren paradoxa*, which measured upwards of three feet in length, was found in a swamp on the left bank of the Amazon above Villa Nuova; the other, which was nearly two feet long, was taken in a pond near Borba, on the river Madeira, a tributary of the Amazon.

PROTRACTOR. Any instrument for laying down angles is so called, such as the graduated semicircle which is found in cases of instruments, the rectangular ruler with graduated edges, and various other more expensive contrivances. But the truth is, that the easiest and safest protractor is a table of chords, a scale of equal parts, and a pair of compasses. Those who have not a sufficient table of chords should take the chord from a table of sines by the formula—

chord of x = diameter × sine of half x.

Even the scale of chords laid down on the rulers,

used in the usual manner, is a better protractor than the graduated semicircle, which is worthless, except for very rough work.

PROVENCE, an old province of France, including a portion of the territory of the Roman *Provincia*, from which the name is derived, was bounded E. by Italy, N. by Dauphiné, N.W. by the Comtat-Venaissin and the Comtat-d'Avignon, W. by Languedoc, and S. by the Mediterranean. It now forms the departments of BOUCHES-DU-RHÔNE, VAR, Basses-Alpes [ALPES-BASSES], and part of VAUCLUSE. It was divided into Upper and Lower Provence, which had Digne and Aix for their respective capitals. In Roman times the country was inhabited by various tribes, and formed part of Gallia Narbonensis. About 416 the Romans were dispossessed by the Visigoths and Burgundians, but recovered a portion along the coast from the former in 450. The next invaders were the Franks, who, in 534, under the sons of Clovis, by conquest or cession, obtained possession of the whole territory, which was included also in the empire of Charlemagne. Under his descendants Provence formed part of the kingdom of Arles; it then passed to hereditary counts descended from the counts of Barcelona. Raimond Bérenger V., the last count of Provence, left four daughters, with the youngest of whom, Béatrix, in 1245, the county of Provence passed to Charles of France, count of Anjou. The Anjevine family held it till 1481, when Charles, count of Anjou, and king of Sicily, made it over to Louis XI. and his successors; and in 1487 it was re-united to the crown by Charles VIII. (Méry, *Histoire de Provence*, 1830; Fabre, *Histoire de Provence*, 1834-8). Some account of the Provençal language is given under FRANCE.

PROVERB (from the Latin *proverbium*). Of the many definitions which have been given of a proverb, the best appears to be the following, by Erasmus:—'A proverb is a well-known saying, remarkable for some elegant novelty.' Synesius, a Christian writer of the early part of the fifth century, quotes from a work of Aristotle, now lost, a description of a proverb to this effect: 'A proverb is a remnant of the ancient philosophy, preserved amidst very many destructions, on account of its brevity and fitness for use.' 'Proverbs,' says Daniel Heinsius ('Dedication' prefixed to Elzevir edition of Apostolius), 'are nothing else but abridged remains of the wisdom which is not comprehended in books, and is conveyed down from hand to hand like an heir-loom.' To collect and explain such portions of wisdom has engaged the attention of some of the most learned men. Zenóbius or Zenódotus, a Sophist who lived at the beginning of the second century, made an epitome of the proverbs of two older writers, in number 552. Diogenianus lived about the same time as Zenobius, and made a collection of proverbs, amounting to 775. These two collections, together with 1400 proverbs out of Suidas, and an appendix of 353 from the Vatican Library, and a selection of proverbs in metre, were well edited by Andrew Schott, 4to., Antwerp, 1612. Michael Apostolius of Byzantium, who lived in the middle of the 15th century, collected 2027 ancient proverbs, of which he wrote explanations. The best edition is that of the Elzevirs, 4to., Lugd. Batav., 1653. The adages of Erasmus, in number 4151, are well known. In 1672, John Ray published his collection of proverbs, which has been often reprinted. The Spanish language is particularly rich in proverbs, many of which have had their origin in national peculiarities. There is a small and valuable collection of English proverbs with explanations, and an ingenious preface, by Oswald Dykes, 8vo., Lond., 1708.

Proverbs generally convey moral instruction, but moral instruction is not essential to a proverb; as we see in such instances as 'Every man has his price;' 'Old birds are not caught with chaff,' and the like. Many proverbs merely inculcate certain rules of conduct or of caution, which experience has shown to be useful for some end or purpose; and yet the end or purpose is in most instances either moral, properly so called, or moral with reference to some standard that has existed or still exists.

PROVERBS OF SOLOMON, one of the canonical books of the Old Testament. This book has always been ascribed to Solomon, though he was not the author of all its contents. The portion from the tenth chapter to the end of the twenty-fourth comprises what may more strictly be called the 'Proverbs of Solomon.' The first nine chapters form a kind of introduction, and the remaining chapters after the twenty-fourth may be regarded as an appendix to the whole.

PROVIDENCE is the superintending care with which God watches over his whole creation, and especially over the human race. It has been generally held, as a direct consequence of the existence of a God who has created all things, that He must also uphold by his constant care everything which he has created. This doctrine however has been denied by the ancient Epicureans and the modern Theists, who, while admitting that God created the universe, and impressed upon it the laws by which it is governed, contend that, having done this, He has left those laws to work out their own results without his further interference. The arguments for a superintending providence are derived from the order of the material universe, which we find to be governed by ever-active principles, of which no other explanation can be given than that they are the results of the power of God in continued exercise; from the events which are recorded in history, and which are daily occurring, such as the punishment of guilty nations and individuals, the exaltation of the virtuous, the adaptation of great men to the exigencies of their times, not to mention other circumstances in the history of individuals, which might be considered of a more doubtful character; and lastly, from the unequivocal statements of Scripture.

The providence of God has been divided by theologians into *immediate*, or that which he exerts without the intervention of second causes, and *mediate*, where ordinary means are employed; into *ordinary*, which relates to occurrences in the common course of nature, and *extraordinary*, where that course is departed from, as in the case of miracles; into *common*, of which the whole

world is the object, and *special*, which regards the church; and into *universal*, which describes the care of God for his whole creation, and *particular*, which is exercised for the benefit of individuals.

PROVIDENCE. [RHODE ISLAND.]

PROVIDENCE, NEW. [BAHAMAS.]

PROVIDENCE, OLD, is an island in the Caribbean Sea, about 125 miles from the Mosquito Coast, and between 13° 19′ and 13° 32′ N. lat., and 81° 20′ and 81° 23′ W. long. This island is nearly four miles and a quarter long, and two and a half in its greatest breadth: it is of an irregular oval shape. The highest ground near the centre of the island rises to 1190 feet above the level of the sea, so that it can be seen at a distance of from 33 to 36 miles. Cotton, sugar, coffee, and fruits are produced in considerable abundance. The island belongs to the Republic of New Granada.

PROVI'NCIA may be defined generally, in its later and more general sense, to be a conquered country, beyond the limits of Italy, which was subject to the Roman state. In contemplating the history of Rome, the most instructive part of it, next to a study of the internal organisation of the state, is the system of provincial government by which the language and laws of Rome were established on a foreign soil. The effects of this system are permanently embodied in the political system of every European state.

The geographical sense of the word Provincia was not the original meaning; originally the term expressed the Imperium which was granted to a consul or prætor beyond the limits of the city. It was long since suggested by Hugo, that Provincia is only an abbreviated form of 'Providentia,' 'foresight,' 'superintendence,' and so forth; of which 'Prudentia' is one abbreviated form, and Provintia (as the word is written sometimes in the MSS.), or Provincia, is another. All other explanations should be rejected. In the time of Cicero provincia had undoubtedly obtained the meaning given at the head of this article; and in the latter part of the Republic the Roman state consisted of two distinctly-organised parts, Italy and the Provinces. This distinction, though with considerable modifications, continued under the Empire.

With the extension of the Roman conquests beyond Italy commenced the system of provincial governments. The oldest provinces were Sicily (B.C. 243) and Sardinia (B.C. 237). Upon the conquest of a country, the commander of the army either gave the conquered country a general organisation, subject to the approval of the senate, or the country was organised according to the instructions of the senate, by the commander and a body of commissioners chosen from the senate, and appointed by it. This original organisation often made very important changes in the existing political forms, but still the conquered people retained their national existence, and were not in all senses incorporated into the Roman state. Originally prætors were appointed to govern the provinces; but subsequently the prætors received a province after the expiration of their year of office at Rome, and were then called proprætóres; and towards the close of the Republic the consuls in like manner received provinces, which were hence called consulares, and they were styled procónsules. The division of the provinces was made by lot, and sometimes by agreement, among the persons entitled to hold them. By a law of C. Gracchus (Sempronia lex), the provinces of the consuls were annually determined before the election of the consuls, for the purpose of preventing all disputes.

By a Senatus Consultum of the year 55 B.C., it was enacted, that prætors and proconsuls should not have the government of a province till five years after the expiration of their prætorship or consulship. The term for which a province was originally held was one year; but the time was often enlarged. The authority of the governor of a province commenced as soon as he left Rome. His functions in the province were both military and civil; he possessed the Imperium, but he was not called a magistratus. In the later Roman writers the common name for governor is præses (Gaius, i. 6), and sometimes the term proconsul seems to be used generally for the governor of a province. The governor was assisted in the discharge of his duties by a quæstor, who looked after the revenue; and by legati, who assisted in the administration, and were generally appointed by the senate, but sometimes by the governor with the permission of the senate. He had also a numerous train of friends and companions, sometimes called contubernales; and also a regular body of clerks, interpreters, and other servants, who formed a prætorian cohort, a name which was also given, and with more propriety, to the soldiers who formed the governor's bodyguard. On a new governor arriving in his province, the former governor was required to leave within thirty days.

The province was treated as a conquered country, though the towns retained somewhat of their municipal freedom, but the constitution of many of them at least was refashioned upon the model of Rome, though in this respect there were probably considerable varieties. Under the emperors the political organisation of the whole empire became more uniform. The towns had the management of their revenue, and the right of coining; but only towns of the highest class could coin silver. They had a senate like those in the Italian towns, but no magistrates with corresponding powers. The religion of the people was not interfered with. Part of the land of conquered countries was sometimes taken by the Roman state, and let by the censors, or the land was restored subject to the payment of a tax. All provincial land paid taxes, except such provincial towns as obtained the Jus Italicum, the effect of which was to give the land included within the limits of such town the qualities of Italian land, and consequently freedom from taxation. The regular jurisdiction in a province was in the hands of the governor, who exercised it by himself and his quæstor and legati; and for this purpose he made circuits in his province. These circuits, sometimes called conventus, formed the divisions of a province for judicial purposes.

A province contained towns in very various relations to Rome; some were allies; others were declared free, and were not under the immediate jurisdiction of the governor. Some towns were Roman Coloniæ, and others were Latinæ Coloniæ. Thus at the close of the Republican period we find in a Roman province allied towns, free towns, Roman colonies, and Latin colonies. The privilege of the Jus Italicum has been explained. The privilege called Latinitas or Latium, was often given to particular towns, one effect of which was to release them from the immediate jurisdiction of the prætor, and to give to them a jurisdiction of their own. Citizens who filled certain offices in such towns, obtained thereby the Roman citizenship, as Strabo (p. 186) remarks, in speaking of Nemausus (Nîmes). When Britain was a Roman province, it contained *both* Municipia, Roman colonies, and towns with the Latinitas, as we learn from Richard of Cirencester, in a passage which the antiquarians have not generally understood, nor seen the full import of. [BRITANNIA.]

The taxes which were raised in the provinces varied in the different countries, according to the products of the provinces, and probably also according to the system of taxation which the Romans found established. The taxes generally consisted in a capitation tax and a property tax: the latter was sometimes paid in money and sometimes in kind. The taxes were *sold* or farmed: thus, after the Sempronia lex, those of the provinces of Asia were sold by the censors at Rome, and those of Sicily, with some exceptions, were sold in the respective districts of the country, according to a practice established by Hiero. There was also money paid for the use of the open pasture-lands, which the Roman state appropriated to itself. The tolls and port-duties, as well as the pasture-land tax (scriptura) were farmed by the publicani. Besides these and other regular sources of revenue, the province was subjected to occasional demands of an additional tenth, and to many exactions, some of which had a kind of legalised form, and others were merely gifts made to satisfy the demands of the governor, or to secure his favour.

The governor had to give an account of his administration from his own books and those of his quæstor. Originally he gave in this account at Rome; but after the Julian law (B.C. 61), he was required to deposit two copies in the two principal towns of his province, and to send one to the Ærarium at Rome. If the province had ground of complaint against him for mal-administration (repetundæ, peculátus), which was no uncommon thing, application was made to the Roman senate; and the great Romans, who were the patrons and friends of the cities which made the complaint, were also applied to for their aid and interest. If he had betrayed the interests of the Roman state, he was guilty of the offence of majestas. A regular mode of inquiry and trial (quæstio) were adopted for such occasions. Yet little was done without bribing the powerful men at Rome; and the chance of redress against a governor who had even grossly misconducted himself was very small: it was more frequently obtained through the influence of the powerful Romans, stimulated by motives of private hostility to the accused, than through the justice of the case.

With Augustus commenced a new period. He took under his own care the more important provinces, and those which required a large military force; the rest he left to the care of the senate and the Roman people. This arrangement continued, with some modifications, to the third century. The condition of the provinces under the early emperors and under the Christian emperors would require a distinct and lengthened notice. Savigny's *Geschichte des Römischen Rechts im Mittelalter*, vol. i., contains valuable information.

PROVINCIAL COURTS. [ECCLESIASTICAL COURTS.]

PROVINCIALISM. The difference between the languages of a family and the dialects of a language is only a difference of degree. For example, the Sanscrit, Persian, Teutonic, Greek and Latin, Slavonic, and Celtic, are languages of the Indo-Teutonic family; and the Doric, Ionic, and Æolic are dialects of the Greek language. Although the dialects of a language may present considerable differences both in the roots and forms of their words, the differences are less considerable than those which obtain between languages of the same family. Thus an historian tracing the origin of the Romance languages might doubt whether he ought to consider them as altered dialects of the Latin language, or as cognate languages of the same family. If the Italian, Spanish, and French languages were considered as modern Latin dialects, their various dialects (such as the Sicilian, Venetian, Milanese, Walloon, Valencian, &c.) would be regarded as mere varieties.

Every language which is spoken by a large population over a wide extent of country, contains several dialects. The number and variety of these is in some cases very great; and, considering the importance of this fact, as bearing on the origin and history of languages, it has not been sufficiently observed by philologists.

The cause of a want of attention to the multiplicity of dialects in a language is to be found in the ascendancy which one dialect of a language always acquires over the others, and the obscurity and neglect to which the latter are consequently consigned. Whenever a country reaches a sufficient height of civilisation to admire and produce literary works, some one of the various dialects of its language is selected by the poets and other native writers, and is cultivated by them. In general, this choice is determined not by any quality of the dialect itself, such as its superior harmony or energy, but by some external circumstance, such as its prevalence near the birth-place or home of the writer, or near the king's court and seat of the government. When a dialect, by any of the means above described, has been distinguished from and raised above the others, it is adopted for all the native literary compositions, both in poetry and in prose. Hence it is still further cultivated, and is moreover thereby ren-

dered more susceptible of ulterior cultivation and refinement. It becomes the general language of the government, of education, of literature, and of polished society; new words are introduced into it from other languages, ancient or modern; and it is learned by foreigners. The rise and progress of one dialect, according to the general description just given, may be observed to have taken place in every civilised country.

The classical *English* is mainly formed upon the dialect spoken in Middlesex, Surrey, Kent, and the other counties in the neighbourhood of London. Its forms differ materially from those of the dialects spoken in the more distant counties, as Devonshire, Somersetshire, Cheshire, Lancashire, and Yorkshire; and still more from those of the dialect of the English which is spoken in the lowlands of Scotland, and in the border counties of England. The latter dialect has received considerable literary cultivation not only from early writers, such as Buchanan, Barbour, and others, but also from Burns, Walter Scott, and their imitators, who have used it with great skill and success for ballad poetry and tales of fiction.

By a provincial word is meant a word which is not received in the literary language of the time, but which is current among the inhabitants of some district. These words are either words which have once been current in the literary language or dialect and have ceased to be so, or words that have never been received in the literary dialect of the country. Sometimes a provincial word is merely a corruption of a genuine word, arising from ignorance.

Provincial dialects are chiefly preserved among the humbler and illiterate classes: educated persons generally speak the literary language of the country. Moreover they are chiefly preserved in rural districts; and thus many of the provincial words relate to agricultural subjects. In Fielding's time, country gentlemen in England often spoke the provincial dialect of their county.

Provincialisms, being either ancient classical words, actually obsolete in the literary language, or diverging words or forms in a parallel dialect, are genuine remains of the ancient language of the country. In this respect they differ materially from the following classes of words:—low, vulgar, or obscene words, which are in general use; slang or cant expressions; and technical words, such as the language of sailors or miners; and neologisms, as *talented*, &c.

Collections of provincial words are important in a philological point of view, as throwing light on the formation, structure, and analogies of languages; they are also important in an historical point of view, as illustrating the changes in the language of a country. Numerous glossaries of provincial words have been published in different countries, but they have generally been constructed with very little skill, and scarcely any view towards a definite end. In England, there are glossaries, as such collections are often called, of the dialects of Norfolk, Suffolk, Sussex, Devonshire, Somersetshire, Cornwall, Herefordshire, Cheshire, Lancashire, Yorkshire, Cumberland, Westmoreland, and Northumberland; to which may be added Jamieson's 'Scottish Dictionary.' A copious list of works illustrating the provincial dialects of England has been published in London.

As several persons appear to be engaged at present in making collections of provincial words in England, it may be remarked that the principal defect of the provincial glossaries which have been hitherto published in this country consists in the brevity and vagueness of the explanations of the words, and the want of illustrative examples of their usage in conversation.

PROVINS. [SEINE-ET-MARNE.]

PROVISORS, STATUTE OF. [BENEFICE.]

PROVOST, a term having its origin apparently in the Latin *præpositus*, which denotes the chief of any society, body, or community. In France the corresponding word *prévôt* approaches nearer the original form. In that country it is applied to the persons who discharge the functions of many different offices, but in England it is rarely used: we believe the only instances are those of the heads of certain colleges, as Eton, King's College (Cambridge), &c. But in Scotland it is used to designate the chief officer in cities, as the provost of Edinburgh or of Glasgow, where in England the same officer is called the mayor.

PROVOST-MARSHAL, a term adopted from the French, who call an officer with similar functions, the Prévôt des Maréchaux de France, or at least did so before the Revolution. The English provost-marshal is attached to the army, his duty being to attend to offences committed against military discipline, to seize and secure deserters and other criminals, to restrain the soldiery from pilfering and rapine, to take measures for bringing offenders to punishment, and to see to the execution of the sentences passed upon them.

PROXY. [LORDS, HOUSE OF.]

PRUDE'NTIUS, AURE'LIUS, a Christian writer, born in Spain, A.D. 348, followed the profession of the law, and was employed in some official situation in his native country under the reign of Honorius. Prudentius wrote several works in Latin verse. Two books are intitled 'Orations,' against Symmachus, prefect of Rome, who had addressed a petition to the emperor in the name of the Senate for the restoration of the heathen worship. He also wrote a series of sacred hymns, which have considerable merit, and some of them have been inserted in the Liturgy of the Roman Catholic Church. His 'Psychomachia' is a description of the struggles between passion and duty in the soul. One of the best editions of his works is that of Parma, 2 vols. 4to, 1788.

PRUD'HOMMES, *Prudentes Homines*, experienced men. In 1452, King René established at Marseille a council of Prud'Hommes, with summary jurisdiction in disputes between the fishermen of that port: this institution has since been frequently confirmed, and still exists. In 1464, Louis XI. granted power to the citizens of Lyon to appoint a Prud'Homme to decide summarily upon disputes that might arise between merchants attending the fair. By a decree of Napoleon, dated March 18, 1806, a council of Prud'Hommes, consisting of nine members (five

manufacturers and four master weavers), elected annually, was established in Lyon to settle disputes between manufacturers and their workmen, and between masters and apprentices. The council acted chiefly as a court of conciliation, but was also vested with power to decide without appeal or expense, cases involving an amount not exceeding 60 francs. This institution has been recognised and confirmed by succeeding governments. Councils of Prud'Hommes with increased numbers, with powers of summons, seizure, and imprisonment not exceeding three days, and with summary jurisdiction to the amount of 100 francs, are now established in all the great manufacturing towns of France, with the exception we believe of Paris. If the amount disputed exceeds 100 francs, an appeal lies to the Tribunal of Commerce. The sittings of these councils are held in the evening, when the workmen have given over their labour for the day. Lawyers are not suffered to plead in their courts. The council of Prud'Hommes is perhaps the most extensively-useful institution in France; in Lyon alone, the cases decided annually exceed 5000; appeals are rare, and a reversal of the decree of the council very much rarer still.

PRUNELLA, a genus of plants belonging to the natural order *Labiatæ*. *P. vulgaris*, Self-heal, is a native of Europe and Asia, very plentiful in America and Australia, and also in England. The flowers are purple, white, or nearly red. This plant is considered astringent. *P. grandiflora* is native throughout Europe in woods and shady places; the flowers are of a purple or violet colour, seldom white. All the species of Prunella are showy when in blossom, and are therefore worth cultivation in flower-gardens and rock-work.

PRUNING. [Planting and Plantations.]

PRUNUS is a genus of arborescent Rosaceous plants, which belongs to the Amygdaleous division of the order, and comprehends several of our domestic fruits. The Cherry, Bird-Cherry, Plum, Damson, Sloe, Bullace, and Apricot, are all comprehended in the genus as limited by Linnæus. But, in the opinion of some modern botanists, the true Plums require to be separated from the others, and should exclusively constitute the genus Prunus, while the others are to be considered as belonging to two other genera represented by the Cherry and the Apricot.

PRURI'GO is a disease of the skin, characterised by an eruption of small pimples and a most intense burning sensation of itching. The pimples are usually only slightly if at all red, and the skin between them has its natural colour. They are generally seated about the shoulders, back, and neck, but often also on the limbs, and in severe cases even on the face and over a great part of the body. Their course is always very slow, and they are not infectious.

There are three principal varieties of Prurigo, namely, *P. mitis*, *P. formicans*, and *P. senilis*; and besides these, some others are distinguished by the names of the parts which are in each exclusively or chiefly affected.

The treatment of the first two, which are the mildest forms of Prurigo, must consist of a mild antiphlogistic regimen, tepid baths, and the use of alkalis both externally and internally. Stimulants of all kinds greatly increase the pain and itching, but they may sometimes be relieved by the application of ointments or lotions containing small quantities of opium, or Prussic acid, or cyanuret of potassium. In the *Prurigo senilis*, which occurs in old people, the regimen must be more nutritious, and tonic medicines are useful; but in this form, as well as in the others, stimulants must be avoided. If the skin is infested with pediculi, the most effectual mode of destroying them is fumigation with the vapour of cinnabar. In this form also sulphur-baths are among the few means that will produce any relief. The alkaline lotions, which may be used in all cases, may be composed of one or two drachms of carbonate of potash to the pint of water, or of from one to three drachms of sulphuret of potash to the same quantity of water, the strength being determined by the irritability of the skin, and being always made less than sufficient to excite any heat or redness in it.

PRUSIAS. [Bithynia.]

PRUSSIA consists of two great divisions, which are unconnected with one another.

The western and smaller portion of the kingdom of Prussia is situated on both sides of the Rhine, and is called Rhenish Prussia (Rhein-Preussen). It extends between 49° and 52° 15′ N. lat., and between 6° and 9° 30′ E. long., and on the south borders of the French department of Moselle. It is bounded W. by Belgium and Holland, N. by the Kingdom of Hanover, E. and S. by Brunswick, Lippe, Waldeck, Hesse, Nassau, Hesse Darmstadt, and part of Bavaria. It comprehends an area of 18,094 square miles.

The eastern and larger portion of the kingdom of Prussia, more properly called Prussia, extends from 49° 50′ to 55° 50′ N. lat., and from 9° 50′ to 22° 50′ E. long. It is bounded N. W. by Mecklenburg, W. by Hanover, Brunswick, and Hesse, S. by Saxony and several portions of the Austrian Empire, and E. by Poland and Russia. The area of this portion is 89,334 square miles. The entire area is 107,428 square miles. The entire population of the kingdom of Prussia in 1847 (exclusive of Neufchatel) was 16,112,948.

Surface, Rivers, and Soil.—I. Rhenish Prussia is divided into two equal portions by the Rhine, and each of these divisions consists of an elevated table-land and a low plain. The table-land on the west bank of the Rhine is connected on its south-eastern border with the Hardt Mountains, as the northern extremity of the Vosges is called. Along the south-eastern banks of the river Moselle is the highest part of the table-land, which appears in the shape of a range elevated on a very high base. Part of this range is called the Hochwald, and another part the Soonwald: its highest elevation is about 2700 feet. The larger part of the table-land lies to the north of the river Moselle, and is called the Eifel, and in its northern districts the Hohe Veen. Much of this table-land exhibits traces of volcanic agency. The soil is in most places poor.

The level country which extends from the

northern border of the Eifel and Hohe Veen, between the Rhine and the Maas, is nearly a flat, which sinks imperceptibly as we proceed northward. Its fertility is considerable, and it produces rich crops of all kinds of grain.

Opposite the table-land of the Eifel, on the right bank of the Rhine, is a similar table-land, which extends southward through Nassau, where it rises along the banks of the Main and Rhine to a more elevated ridge, known under the name of Taunus. From the Taunus the table-land extends northward, and terminates on the northern bank of the river Ruhr, an affluent of the Rhine. The soil is very poor, but iron and coal are in abundance on the table-land, and these have given rise to considerable manufacturing industry.

The Rhine separates the two table-lands just mentioned, and runs in a narrow valley, frequently through deep gorges noted for their picturesque beauties.

II. The eastern and larger portion of Prussia is a part of the great plain of Eastern Europe. On the boundary of Prussia and Bohemia is that mountain range which bears the general name of the Sudetes, and whose northern portion is called Riesengebirge, or Giant Mountains. [BOHEMIA.] There are mountains also on the line which separates Prussia from Saxony. Where the south-western angle of Prussia is intersected by the duchies of Saxony and the territories of the princes of Reuss, and partly also by Hanover, it comprehends part of the two mountain-systems of the Thüringerwald, or mountains of Thuringia, and of the Harz. The highest summit of the Sudetes is Schneekoppe, or Riesenkoppe, which is 5291 feet high; of the Thüringerwald, the Great Beerberg, 3258 feet; and of the Harz, the Brocken, 3729 feet.

The great plain is not a dead level, but the surface is diversified by several moderate elevations. Two of these traverse this portion of Prussia from east to west in its whole extent. From the northern elevation the country slopes to the shores of the Baltic with an undulating surface, which is seldom varied by a hill. To the south-east of the higher portion of the elevation extends the Tuchler Heide (Heath of Tuchel), which is fifty miles in length, and from twenty to twenty-five in width. On the northern side of the elevation the country is of moderate fertility, but it improves as we approach the shores of the Baltic. The southern elevation is connected at its eastern extremity with the mountains of Sandomir, in Poland, and with those surrounding the mining town of Olkusz, north-east of Cracow. It extends westward to the Elbe, near Magdeburg, and rises at its highest point to an elevation of about 1000 feet. The country which lies between the two elevations, west of the meridian of 19°, is not distinguished by fertility, except in some of the river bottoms; the other parts are rather more productive. The country to the south of the southern elevation is more favoured by nature than the other parts of the Prussian kingdom. Completely sterile tracts are rare, and of small extent; the country about the town of Magdeburg is noted for its fertility, and is considered the granary of Berlin.

In Rhenish Prussia the chief river is the Rhine, which traverses this division of the monarchy from south to north, and is navigable for large vessels as far as it flows through the Prussian dominions. [RHINE.] Several rivers join the Rhine from the east and west, among which are the Sieg, Wipper, Ruhr, Lippe, and Moselle.

In the eastern provinces of Prussia four large rivers, the Elbe, Oder, Vistula, and the Niemen, traverse the elevations which run through the country. The ELBE, NIEMEN, and VISTULA, are described separately. The Oder rises in Moravia, in the Sudetes Mountains, flows through Silesia, passes by Breslau, where it becomes navigable for barges, enters Brandenburg, and, flowing thence through Pomerania, falls into the Baltic in Swinemünde Bay. Between the two elevations however the affluents of these rivers run east and west, and as many of them are navigable for river boats, they facilitate the intercourse between the countries on their banks. The minor rivers are the Saale, Unstrut, Elster, Havel, and Spree, which fall into the Elbe: the Klodnitz, Bartsch, Warta, Netze, Bober, Neisse, Finow, Ucker, and Peene, which fall into the Oder; the Brahe, which falls into the Vistula; the Yura and Scheschuppe, which fall into the Niemen; and the Persante, Elbing, Pregel, Deime, and Dange, which fall into the Baltic.

Productions and Commerce.—Prussia does not possess a great variety of natural productions, but it has all those the cultivation of which has been gradually introduced into central Europe, and the most indispensable of them in sufficient abundance for its own consumption, and for the obtaining of foreign luxuries and comforts. Of domestic animals all the usual kinds are here met with. Of wild four-footed animals there are: 1, Fit for food —stags, fallow-deer, wild boars, hares, and rabbits. The great northern hare is sometimes met with. 2, Beasts of prey and fur-bearing animals—wolves, foxes in abundance, bears rarely, lynxes, beavers, badgers, pole-cats, otters, weasels, and martens; the ermine is very rare. Domestic poultry of all kinds are in abundance. Of birds of prey, there are the eagle, the sparrow-hawk, the kite, and some others. Fish of various kinds are extremely abundant, as well in the rivers as on the long line of coast on the Baltic. Bees and silk-worms are reared.

Agriculture is the chief source of the national wealth, and is carried on with great care in most of the provinces. Wheat, rye, oats, and barley, are raised both for home consumption and exportation; there are likewise peas, beans, vetches, millet, maize, rape-seed, and linseed. Potatoes are cultivated in all the provinces. Flax, hemp, hops, tobacco, succory, beet-root, and garden vegetables of all kinds are raised, but of the first three articles not enough for home consumption. The vineyards of Rhenish Prussia are extensive and valuable. There is abundance of timber. The mineral products are salt from salt-springs, of excellent quality and in great abundance; amber and coals in large quantities; alum, vitriol, saltpetre, alabaster, basalt, granite, porphyry, marble, slate, freestone, chalk, lime, porcelain-clay, pipe-clay, &c. The metallic products are silver, copper,

lead, iron, zinc, cobalt, arsenic, and calamine. The precious stones are the onyx, agate, jasper, and carnelian.

The principal manufactures are :—Linen in all the provinces, but chiefly in Silesia ; woollen cloths and cotton goods, especially in the province of the Rhine, at Elberfeld, Barmen, Crefeld, &c. ; silk, leather, iron, and copper ware, cutlery, articles of gold and silver, succory, paper, china, glass, earthenware, snuff and tobacco, beet-root sugar, gunpowder, &c. The breweries and brandy distilleries are very considerable.

The abundance of products of various kinds, and the active industry of the people, give occasion to an extensive commerce, which is highly favoured by the advantageous position of the country in the centre of Europe, the great extent of coast on the Baltic, and by the great rivers (the Rhine, the Elbe, the Oder, and the Vistula,) which traverse the country, and are connected by navigable tributary streams and numerous canals. In 1831 the Prussian or Commercial League (Zollverein) commenced, and has since been gradually joined by almost all the German states. The object is to establish an entire freedom of trade among the German states, and to subject foreign trade to such restrictions only as the protection of national manufactures or the financial circumstances of the state may render necessary. The Prussian harbours are :—Memel, Pillau, Neufahrwasser, near Danzig, Stolpermünde, Rügenwald, Kammin, Schweinemünde, Peenemünde, Griefswald, Stralsund, and Barth. The most considerable commercial towns are :—Berlin, Königsberg, Danzig, Breslau, Stettin, Magdeburg, Cologne, Elberfeld, and Aix-la-Chapelle. The great fairs are those of Breslau, Frankfurt-on-the-Oder, and Magdeburg. At present (January, 1850) there are in Prussia 1524 miles of railway open for traffic, and 560 miles are in course of construction.

Religion, Education, Population, &c.—There is, properly speaking, no state religion. That of the royal family and of the majority of the people is Calvinism, but Roman Catholics are numerous, and Christians of all denominations are equally admissible to all public employments. The Lutherans and Calvinists in 1817 formed a union, and became one religious body called Evangelical Christians.

The Prussian government pays great attention to the diffusion of useful knowledge, and manifests equal zeal in encouraging the lowest as well as the superior institutions. For the education of the people, there are in all the towns elementary schools, Sunday and infant schools, schools for mechanics, &c. There are gymnasia for the higher branches of education, and also universities at Berlin, Bonn, Breslau, Greifswald, Halle, and Königsberg, to the support of which the government applies large sums. The literary and learned societies are very numerous.

The whole kingdom of Prussia is divided into 8 Provinces, and these into 25 Governments.

The Provinces are PRUSSIA, POSEN, POMERANIA, BRANDENBURG, SILESIA, SAXONY, WESTPHALIA, and RHEIN-PROVINZ. In Prussia are the Governments of DANZIG, GUMBINNEN, KÖNIGSBERG, and MARIENWERDER. In Posen are BROMBERG and POSEN. In Pomerania are CÖSLIN, STRALSUND, and STETTIN. In Brandenburg are FRANKFORT and POTSDAM. In Silesia are BRESLAU, LIEGNITZ, and OPPELN. In Saxony are ERFURT, MAGDEBURG, and MERSEBURG. In Westphalia are ARNSBERG, MINDEN, and MÜNSTER. In the Rhein-Provinz are AIX-LA-CHAPELLE, COBLENZ, COLOGNE, DÜSSELDORF, and TREVES. See also NEUFCHATEL. The King of Prussia has also recently obtained by treaty the small state of HOHENZOLLERN.

The Constitution of Prussia was an unlimited monarchy, but in consequence of revolutionary disturbances, a constituent body was assembled in 1848, and sat in Berlin till Nov. 10, 1848, when it was dispersed by the military. The King of Prussia has since granted a constitution, under which an Upper and a Lower House of Representatives are now (January, 1850) sitting.

History.—The history of Prussia is brought down in the articles BRANDENBURG and FREDERIC WILLIAM the Great Elector, and his successors, to the end of the reign of FREDERIC WILLIAM III. in June, 1840.

The present king was engaged from 1840 till 1848 in several measures which seemed calculated to favour constitutional freedom, popular education, and religious tolerance, but not without indications of wavering and irresolution. The Revolution of 1848, and the political proceedings of 1848-9, have left it somewhat doubtful as to what may be the settled form of the Prussian government.

PRUSSIA, properly so called, formerly designated by the name of the Kingdom of Prussia, and afterwards divided into the two provinces of East and West Prussia, now forms only one province, which is called the Province of Prussia. It is situated between 52° 54′ and 55° 53′ N. lat., and between 16° 42′ and 22° 45′ E. long. It is bounded on the N. by the Baltic, which washes the coast for about 270 miles ; on the E. by Russia ; on the S. by Poland and Posen ; and on the W. by Bradenburg and Pomerania. The area is 24,780 square miles, and the population is 2,499,424.

The climate is temperate and healthy, though very cold in winter, very changeable on the coast, and generally rather damp. The face of the country is level, but broken here and there by low ranges of hills. The principal rivers are the Vistula, the Pregel, and the Niemen. There are about 300 small lakes in East Prussia, and 150 in West Prussia ; but no large lakes, unless we reckon as such the two Haffs, which communicate with the sea only by canals, and have fresh water. With regard to the natural productions, the province produces corn, flax of excellent quality, hemp, tobacco, hops, madder, potatoes, and timber. There are good breeds of the usual domestic animals, abundance both of fresh-water-fish and sea-fish, and bees. The mineral kingdom is very poor ; iron, however, in various forms is abundant, and that singular production, amber, is far more plentiful in this province than in any other part of the world. The manufactures of the province are confined to the towns, of which the principal are Danzig, Elbing, and Königsberg.

After the Goths left the shores of the Baltic, they were succeeded by different Sclavonian tribes. Conrad, duke of Masovia, being unable to defend his country against these mercenaries, called to his assistance the Teutonic knights, to whom he assigned, in 1230, a tract of land on the Vistula, where they built Thorn and Culm. The knights retained possession of East Prussia till 1525, when it was made a grand-duchy, and given to Albert of Brandenburg, as a fief of Poland.

PRUSSIAN BLUE, a pigment of a pure dark-blue colour, discovered accidentally by a colour-manufacturer of Berlin, in 1704. It is a prussiate of iron, consisting of 52 parts of red oxide of iron combined with 48 parts of prussic acid, to which is added a certain proportion of alum, in order to give more body and greater brightness to the colour.

PRUSSIC ACID, *Medical Properties of.* [HYDROCYANIC ACID.] When first introduced into medical practice, high expectations were formed of the utility of Prussic Acid. Subsequent experience has moderated these expectations; but there is no doubt that it might be found useful in many instances where it is not employed, the dread of accidents deterring many medical men from using it. Such hesitation displayed by those who know its properties should furnish a salutary caution to all persons against employing it on their own responsibility. The diseases in which it has been most recommended are—affections of the lungs, whether acute inflammation, after the active stage is passed, or those of irritation. Among the former, hooping-cough is unquestionably benefited by it. But here great caution is necessary. The dose should at first be very small, and very slowly increased. Some affections of the stomach receive signal relief, others derive not the least benefit, from it. Cutaneous diseases are alleviated by lotions and ointments containing hydrocyanic acid. It is a valuable remedy when carefully employed, in all cases of irritation.

When it is ascertained or suspected that any one has taken a poisonous dose of Prussic Acid, cold water should be dashed over the head and back. The vapour of ammonia (smelling salts) or of chlorine should be applied to the nostrils; or very dilute liquor ammoniæ may be thrown into the stomach. While these things are doing, other persons may prepare a weak solution of carbonate of potash (common pearlashes will answer); and some sulphate of iron (copperas) is to be dissolved in a large quantity of water. Some of the solution of the carbonate of potash is to be given to the patient, followed immediately by some of the solution of copperas. This, if done promptly, will save the patient. Artificial respiration, if speedily resorted to, is useful, as is likewise bleeding from the jugular vein.

PRUTH, the *Pórata* of Herodotus (iv. 48), a large navigable river, rises in the Carpathian mountains, in the circle of Stanislawow. It flows for about 30 miles to the north, and then to the east through the Buckowina into Moldavia. From the point at which it leaves the Buckowina, it has formed for the whole remainder of its course, since the peace concluded at Bucharest in 1812, the boundary between Russian and Turkish Moldavia. After a course of about 500 miles, it falls into the Danube below Galacz.

PRYNNE, WILLIAM, born in 1600 at Swainswick, near Bath, took his B.A. degree at Oxford in 1620, and was soon afterwards called to the bar by the Society of Lincoln's Inn. He became attached to the Puritan party, and in 1632 published a virulent pamphlet called 'Histrio-Mastix, or a Scourge for the Stage-Players;' for which the Star Chamber fined him 3000*l.*, ordered him to be expelled from the university of Oxford and the Society of Lincoln's Inn, and degraded from the bar, to be set twice on the pillory, and to lose both his ears, to have his book burned by the common hangman, and to be imprisoned for life. Three years afterwards, while imprisoned in the Tower under the above sentence, he published another pamphlet, entitled 'News from Ipswich,' reflecting severely upon the hierarchy generally, and upon Laud and several of the bishops in particular. For this publication he was again prosecuted in the Star Chamber, and received a severe sentence. He was imprisoned in Caernarvon Castle, and subsequently in the island of Jersey. Public opinion meantime declared itself strongly against these proceedings. In 1641 he was liberated by the Long Parliament, and his sentence declared illegal. He was soon afterwards returned as a member of that parliament, for Newport, in Cornwall; and was made a bencher of Lincolns' Inn and recorder of Bath. He took no part in the proceedings of the later years of the Long Parliament, and immediately before the king's trial he was ordered into the custody of the serjeant-at-arms for 'denying the supremacy of parliament' in a pamphlet entitled 'The Memento.' On Dec. 6, 1648, he was, together with many of his party, ejected from the House of Commons. From this time he became a bitter enemy of Cromwell and the army party; and in consequence of his writings against them, was again imprisoned for several years in Dunster Castle in Somersetshire and Pendennis Castle in Cornwall. On his release, in the early part of the year 1660, having returned to his seat in the House of Commons as an excluded member, he is said, in a letter to General Monk (Winwood's 'Memorials,' vol. iii.), to have 'exceedingly asserted the king's right.'

Soon after the Restoration he was appointed keeper of the records in the Tower, an office for which his habits of study peculiarly fitted him. He died in Oct. 1669.

Prynne was a most laborious and voluminous writer. A catalogue of his works (which consist of nearly 200 volumes) is given, after an account of his life, in Wood's 'Athenæ,' vol. iii., p. 844, edit. Bliss.

PRY'TANIS (Πρύτανις), the name of the chief magistrate in many of the Grecian states. In some states the Prytanis had the superintendence of all matters relating to religion. We read of this office in Corinth, Corcýra, Milétus, Ténedos, Pérgamos, Cos, Rhodes, &c.

At Athens, the name of Prytanes was given to

the members of the senate of Five Hundred, while they acted as presidents of the senate and of the assemblies of the people. All the members of the senate discharged their functions in a fixed cycle or order.

The Prytanes had a building to hold their meetings in, where they were entertained at the public expense during their prytany. This building was called the Prytaneion, and was used for a variety of purposes.

PRZEMYSL. [GALIZIA.]

PSALMANAZAR, GEORGE, was born about 1679. All that we know of his early history is from his own memoirs, which do not tell us his true name nor that of his native country, though it is generally believed that he was a native of the south of France. ('Memoirs of ....., commonly known by the name of George Psalmanazar, a reputed native of Formosa, written by himself,' London, 1765.) He was in his youth a wandering adventurer, and came at last to England, where he continued for several years to act the part of an impostor, and published a fabulous account of the island of Formosa, which imposed upon the credulity of the public. At last, when about 32 years of age, a moral change took place in him; he determined to reform. He applied himself intensely to study, and became engaged in literary pursuits. He died in London, in 1753. He wrote, for the 'Universal History,' most of the parts concerning ancient history, except that of Rome; a volume of Essays on several scriptural subjects; besides his own memoirs already mentioned. He also wrote, for the 'Complete System of Geography,' 1747, an article on the island of Formosa, founded upon authentic information, as a reparation for the stories which he had palmed upon the public in his former account.

PSALMODY, in its widest sense, signifies the Psalms of David set to music and sung. But from the early part of the 16th century the term has been applied only to metrical versions of the Psalms to which short grave airs are either set or adapted.

Among the inferior orders of clergy in the church of Rome were the Psalmistæ, whose first institution appears to have been at the commencement of the fourth century. It is believed that this order was established for the purpose of encouraging and regulating the ancient psalmody. By degrees the greater part of the psalm-tune was surrendered to a single voice, the congregation joining only at the close. This led to a more scientific and perhaps a more refined mode of singing, requiring superior knowledge; but Huss, and afterwards Luther and Calvin, restored to the people their share in the divine service, furnishing them at the same time with the means of performing it in a manner agreeable to themselves, and conformably to what they conceived to be the true principles of public worship. With this view the Psalms were turned into metre, tunes were composed or adapted, and the practice of psalmody soon became a marked distinction of those who departed from the church of Rome. Luther however was friendly to harmony, or music in parts; the severe Calvin, on the contrary, sternly refused to admit anything but simple unaccompanied melody. Marot and Beza translated the Psalms into French verse; and Sternhold and Hopkins into English verse. Who composed the most popular and permanent psalm tunes is a question involved in much obscurity.

The first complete collection of psalm tunes for four voices deserving notice was published in 1621, by Thomas Ravenscroft, Mus. Bac., to which Tallis, Morley, Dowland, and all the great masters of the day contributed. The name of John Milton, the father of the poet, also appears there, as the composer of York and Norwich tunes. The editor supplied many, some of which are still in use; and to his collection all the numerous works of the kind since printed have been much indebted. About the year 1671, John Playford, a good musician and a most useful, industrious editor, printed, in 8vo., 'The Whole Book of Psalms in three parts,' in which he has judiciously given the melody to the soprano voice, to which it naturally belongs, and it ever since has retained its place, instead of being given to the tenor. Dr. Miller of Doncaster, about sixty years ago, effected a considerable improvement in psalmody by his 'Psalms of David for the use of Parish Churches,' in which the version of Tate and Brady was employed, and drove Sternhold and Hopkins from many of their strongest positions. The extraordinary success of that work, which made its way into the remotest parts of Great Britain, raised up a host of rivals, and the number of publications and of new tunes has since increased beyond calculation. Parochial psalmody has received considerable attention from musical societies and composers for several years past.

PSALMS (ψαλμοί, from ψάλλω, *to strike gently*, and so, to play on a stringed instrument) denote generally the poems which form one of the canonical books of the Old Testament. This book is called in Hebrew the 'Book of Praises.'

The book of Psalms is often called the 'Psalms of David,' though many of them were not written by him. The authors named in the titles are Moses, David, Solomon, Asaph, Heman, Ethan, Jeduthun, and the sons of Korah. Between the earliest and latest of the Psalms, a period of about one thousand years seems to have intervened.

The canonical authority of the book of Psalms has never been disputed.

PSALTERY, an ancient musical instrument of the harp kind, in use among the Jews, and supposed by Blanchinus to have been the *nebel* mentioned in several of the Psalms. Whether this instrument was square or triangular, whether played on by the finger or struck by a plectrum, seems doubtful; the probability is that it took many forms, and was played in both ways. According to Mersenne, and after him Kircher, this instrument was in shape a trapezium, and similar to, if not the same as, the dulcimer. [DULCIMER.]

PSE'LAPHUS, according to Herbst, a genus of Coleopterous insects, but now regarded as a family, to which the name *Pselaphidæ* is applied. The *Pselaphi* are very minute insects, and most remarkable in their structure. By some entomo-

logists they are arranged with the *Brachelytra*, owing to their having the wing cases short and truncated; and by others they are placed in the section *Trimera*, their tarsi having but three joints: in the classification of Latreille they constitute the last family of Coleopterous insects, being placed at the end of the Trimera.

Scarcely any of the known *Pselaphi* exceed one-twelfth of an inch in length, and the greater portion of them are under that size; they prey upon other insects still smaller than themselves, and are found under stones, and amongst herbage, especially in damp situations: some species are found under the bark of trees, and in putrid wood, and the species of one of the genera are found in ants' nests (the genus *Claviger*). They are often collected during the winter months by shaking the moss from the roots of trees, or from old walls, over a piece of white paper or cloth. They are probably found in all parts of the world.

PSEUDO-BOA, Schneider's name for a genus of serpents (*Scytale*, Merr.) arranged by Cuvier as a subgenus of *Boa*, and described as having plates not only on the muzzle, but on the cranium, like the *Colubri*; no fossets; a round body, and the head 'd'une venue avec le tronc,' as in *Tortrix*.

PSEUDOCA'RCINUS, M. Milne Edwards's name for a genus of Cancerians or Crabs, allied in some respects to the *Xanthi*. Locality, the Indian Sea, the seas of Australia, &c.

PSEUDOZOA'RIA. From the earliest times when systematic views of nature were sought, clouds have overhung the obscure confines of the animal and vegetable kingdoms. We find Aristotle perplexed regarding the animal or vegetable nature of sponge, Trembley and Ellis removing errors regarding the Hydræ and Celluliferous Polypiaria, Lamarck classing Corallina with animals, and Blainville deciding that it is a plant. Much of this difficulty arises from the various definitions which are employed to characterise animal existence. To show irritability of parts, to have the faculty of self-movement, to exhibit sensibility—such or other characters being assumed for animals, we shall always find in some part of the vast series of life some particular beings in which these characters become unrecognisable (though they may exist), or equivocal, even if they do not conduct to erroneous results.

One of the modes by which systematists have eluded a difficulty, which nothing but strict and patient scrutiny can conquer, is by constituting an intermediate order of life, so vaguely characterised as to embrace the doubtful conterminous tribes of the animal and vegetable races. Hence the terms *Phytozoa*, *Zoophyta*, *Nematozoa*, and, according to the same analogy, *Lithophyta*, *Ceratophyta*, *Calciphyta*, to express the stony or horny nature of the animal or vegetable structures, or even to convey some hint of their analogy to mineral aggregations.

Pseudozoaria is a term of the same order proposed by Blainville to include vegetables, many of which have been ranked with the *Polypiaria*. It is subdivided into two classes: *Calciphyta*, which are principally composed of the genus *Corallina*, Linn.; and *Nematophyta* (also called *Nematozoaria*), which include *Conferva*, *Oscillatoria*, *Byssus*, &c.

PSI'DIUM, a genus of plants belonging to the natural order *Myrtaceæ*. The species are trees or shrubs, natives of America within the tropics. The fruit is edible, and is known by the name of Guava. It has a fragrant but peculiar odour and very sapid taste, and is eaten both raw and when made into jelly. *P. pomiferum*, Apple-bearing or Common Red Guava, is native of the West Indies, Mexico, and South America. *P. montanum* is native of Jamaica on the mountains. The fruit is small, acid, and smells strongly like bitter almonds, hence it is called *Almandron*. The wood is very hard and of a fine colour and grain. It works well, takes a fine polish, and is much esteemed for ornamental purposes.

PSI'THYRUS (Saint-Fargeau), a genus of Hymenopterous insects belonging to the section *Anthophila* (Latreille) and family *Apidæ*. The insects of this genus so closely resemble the Humble-Bees (*Bombus*) that till recently they were by all authors confounded with them. The Psithyri however differ widely from the Humble-Bees, inasmuch as they make no nests of their own, neither do they collect food for their young, but, like the cuckoo among birds, they deposit their eggs in the nests of others, and leave their young to be hatched and reared by them. It is the nests of Humble-Bees that they select for this purpose. Mr. Newman considered these facts relating to their economy so important, that he established an order among Hymenopterous insects, to which he gave the name *Apathites* (from ἀ, without, and πάθος, affection), for the reception of the present insects, which, according to him, constitute the genus *Apathus*, and some other genera of bees.

Four or five species of Psithyrus are found in England, and these are well described by Kirby in his 'Monographia Apum Angliæ.' They are arranged by that author in his genus *Apis*, section **, c. 2, which section also includes the true *Bombi*.

PSITTA'CIDÆ, *Parrots*, an extensive and interesting family of scansorial birds, remarkable for the beauty of their colours, their powerful bill, their fleshy tongue, and, in many cases, their capability of imitating the human voice. At an early period the Greeks and Romans became acquainted with several species of these birds from India. They were favourites in the palaces of princes, and regarded by the people as objects of reverence. It was not, however, until the times of Nero that the Romans became acquainted with species indigenous in Africa, and hundreds, at a later period, were sacrificed to supply the luxury of Heliogabalus.

The geographical distribution of the *Psittacidæ* is very extensive. Africa, India, the Indian Islands, Australia and its islands, South America, and the warmer regions of North America, present us with their respective species.

We cannot altogether omit to notice some points of organization in the *Psittacidæ*. In most birds the upper mandible has more or less the power of

motion. In the *Psittacidæ* this power is highly developed, for the upper mandible is not connected with the skull by yielding and elastic plates, as is the case with birds in general, but constitutes a particular bone distinct from the rest of the cranium, and articulated to it. The advantages derived to the animal from this conformation are obvious to any one who watches a parrot taking its food, or using the bill as a third extremity, to assist it in climbing about its cage.

In most birds there is a progressive increase in the number of the phalanges of the toes: thus the great toe has two, the next three, the middle toe four, and the outer toe five. The parrots possess a peculiar cross-bone belonging to the great toe. In common with the pigeon and some other birds, they are destitute of a gall bladder. Their intestines are very long, and are without cæca. The soft thick tongue so characteristic of this tribe must be a highly sensitive organ of taste. It is covered with papillæ, and moistened with a salivary secretion, so that they are able to taste and select different articles of food. In some of the forms, the *Trichoglossi* of Australia, for instance, which feed on the nectar of flowers, the brush-like tongue is fringed with tubular processes, in conformity with the suctorial mode of feeding adopted by these birds. The ordinary Parrots, Cockatoos, Maccaws, &c., feed upon different fruits, and some upon roots, for the procuring of which the strong upper mandible is extremely prolonged.

The *Psittacidæ* are monogamous, and make their nests in the holes of trees, which they climb with their feet and bill. The shortness of their wings not permitting them to pass wide seas, the old and new continents, and even some of the large islands, have their particular species. Their natural voice is loud, harsh, and grating, almost beyond endurance.

The Cockatoos, and other species of Parrots, discharge a quantity of mealy dust from their skin, especially at pairing time; but the separation of this peculiar matter from the skin is not confined

to this family, but is effected in other birds of different orders, Eagles and Herons for example.

The sub-families and genera into which the *Psittacidæ* are divided are very numerous, and have been lately increased by new accessions. The views of Mr. Vigors as to the arrangement of the *Psittacidæ* are given in 'Linn. Trans.,' vol. xv.; and those of Mr. Swainson in his 'Classification of Birds.'

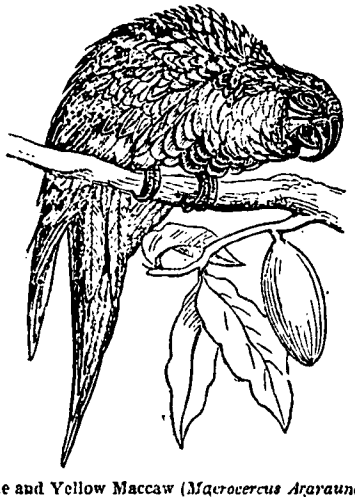
The chief forms are as follows, but we cannot enter into specific details:—

The Maccaws. Genus *Macrocercus*. Locality, the warmer regions of America. Example, *M. Ararauna*, from the Brazils, &c.

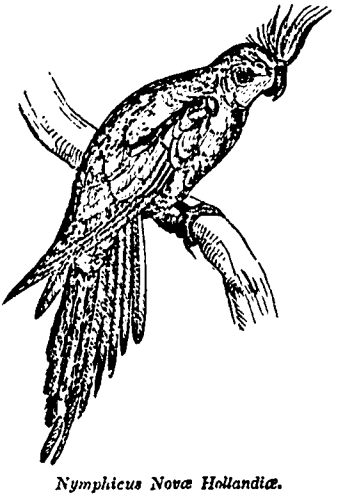
The Parrakeet-Maccaws. Genus *Psittacara*. Locality, the New World. Example, *P. leptorhynca*.

The Ring-Parrakeets. Genus *Palæornis*. Locality, India. Example, *P. Alexandri*, from Ceylon.

Ring Parrakeet (*Palæornis Alexandri*).



Blue and Yellow Maccaw (*Macrocercus Ararauna*).



Nymphicus Novæ Hollandiæ.

The Loriets, or Ground Parrakeets. Genus *Platycercus*. Locality, Australia. Example, *P. scapulatus*, generally known as the Tabuan Parrot, or King's Parrot.

Genus *Nymphicus*. Locality, Australia. Example, *N. Novæ Hollandiæ*.

Genus *Euphemia*. Locality, Australia. Example, *Euph. undulata*, from the interior of New South Wales.

The Lorikeets. Genus *Trichoglossus*. Locality, Australia. Example, *Trich. hæmatodus*, or Blue Mountain Parrot of New South Wales.

The Lories. Genus *Lorius*. Locality, the islands of the East. Example, *Lorius Domicella*, from the Moluccas.

The Cockatoos. Genera *Plyctolophus* and *Calyptorhynchus*, locality, Australia; and *Microglossus*, of which the Goliah Arratoo, of Papua, New Guinea, &c., is an example.

Crested Cockatoo (*Plyctolophus galeritus*).

The Parrots. Genus *Psittacus*, of which some, constituting the sub-genus *Chrysotis*, Swains., are natives of South America. The species of the restricted genus *Psittacus* all belong to the Old World. Wagler's genera *Electus*, *Pionus*, and *Psittacodis*, are restricted in locality to the Moluccas and New Guinea.

The genus *Nestor*, Gould, is Australian.

The Love-Birds. Genera *Psittacula* and *Agapornis*. Locality, the Old World.

We may observe that those who keep birds belonging to the *Psittacidæ* would do well to observe their natural habits in a state of health, and ascertain the character of the food on which they live in a state of freedom. Some live upon the nectar of flowers, others on soft fruits, and others again on hard fruits, for breaking which they are gifted with a very powerful bill. A case has occurred where the upper mandible of the bill of a parrot of this last description, which had been kept upon soft food, grew to such a length as to begin to penetrate its throat. To such birds a proportion of hard food, such as almonds, and even harder food, should be presented. Some of the tribe have bred in captivity; and there is little doubt that if pairs were kept in good roomy cages, with a part of them so fitted up as to remind them of their favourite hollow trees, and furnished with dry rotten wood or vegetable earth, the instances would be comparatively frequent.

(Lear's *Parrots*; Swainson's *Zoological Illustrations*, 1st and 2nd series; Selby's *Parrots*, containing many beautiful figures after Lear, though on a small scale, and forming the sixth volume of the *Ornithology* of the *Naturalist's Library*; Gould's work on the *Birds of Australia*, in which every known Australian species is figured and described.)

PSITTIROSTRA, M. Temminck's name for a genus of granivorous birds, which he places between the Crossbills (*Loxia*), and the Bullfinches (*Pyrrhula*).

Example, *Psittirostra Psittacea* (*Loxia Psittacea*, Lath.; *Psittirostra icterocephela*, Temm).

M. Temminck remarks that the above is the only species known to him, and that it is found in New Holland; but he adds that he possesses a portrait of a second species, which is green, with a gray beard.

PSKOW is a government of Russia, situated between 56° and 58° N. lat., and between 27° 20′ and 32° 5′ E. long. It is bounded N.W. by lake Pskow, N. by St. Petersburg, N.E. by Novogorod, E. by Twer, S.E. by Smolensk, S.W. by Witepsk, and W. by Livonia. The area is about 17,000 square miles. The population is 775,800.

The surface is level, and in some places slightly undulating: there are no mountains, though the whole country is rather elevated. The soil is partly clayey, partly sandy, and in many parts covered with a tolerably thick layer of mould. Lake Pskow, which is a bay of Lake Peipus [TSCHUDSKOE-SEE], with which it is connected by a broad channel, is the largest sheet of water in the government. The other lakes are small. The rivers are the Düna, Loweth, Polista, Pola, Welikaja, Szelon, and Toropez.

Agriculture is the chief occupation of the inhabitants. The soil is in general tolerably fertile, but requires careful cultivation and manure. The grains chiefly cultivated are rye, barley, oats, and buckwheat; and of pulse, peas, beans, and lentils: very little wheat is grown. Culinary vegetables, such as cabbages, turnips, onions, garlic, and cucumbers, are cultivated. Flax, hemp, and timber, are abundant. The breeding of cattle is merely subservient to agriculture. Beasts of prey are rather numerous. The only mineral products are bog-iron, limestone, sandstone, and clay. There are salt-springs near the Szelon, but no use is made of them.

The inhabitants excel in dressing skins and manufacturing leather; but other industrial pursuits are not much followed. The exports of the government are chiefly confined to its own natural productions—rye, oats, barley, squared timber, masts, spars, planks, hemp, flax, hempseed and linseed, wool, hides, and a few other articles.

The great majority of the inhabitants are Russians of the orthodox Greek religion. Education is not much attended to in this government.

The government is divided into eight circles:

Pskow, Porkhow, Ostrow, Nowershew, Opatschka, Welikaja-Luki, Toropez, and Kholm.

Pskow, the capital of the government, is in 57° 40′ N. lat., and 28° 10′ E. long, on the left bank of the Welikaja, nearly five miles from its mouth in Lake Pskow. It was a place of some importance nine centuries ago. At present the interior of the city has some resemblance to that of Moscow. In the centre of the town is the Kremlin, on the steep left bank of the river. The middle town, extending in the form of a semicircle about the citadel, is also surrounded with a wall; a third very high and strong wall, five miles in extent, defends the great town, which surrounds the middle town. The fortifications, erected in 1701, by Peter the Great, have almost entirely disappeared. There is also a large suburb. Pskow has a cathedral, several churches, a Lutheran church, three monasteries, an ecclesiastical seminary, a gymnasium, and other schools, an orphan asylum, and a handsome building for the government offices. The population is about 12,000.

Toropez, the chief town of the circle of the same name, is an ancient town, extremely well situated for carrying on an extensive trade, and having 7000 or 8000 inhabitants.

PSORA'LEA, a genus of *Papilionaceæ*, of the natural family of *Leguminosæ*. The species, about sixty in number, and natives of different parts of the world, are either herbaceous plants or low shrubs, some of them ornamental, and all of easy culture. *P. esculenta*, the Bread-Root of North America, is cultivated along the banks of the Missouri and in other parts of that country. The roots, which abound in farinaceous matter, are, like the tubers of the potato, employed as food, especially during the winter months. In this climate it will grow in the open air, but requires the protection of a frame to produce abundant crops of roots. *P. corylifolia* is diffused over every part of India, especially in the vicinity of villages, during the rainy and cold seasons. It is employed as a stomachic and deobstruent. Other species are also used medicinally.

PSORI'ASIS is a disease of the skin distinguished by slightly raised red patches of various extent and form, and generally covered with whitish scales. Several varieties of the disease have received different names, according to the form and severity of the eruption in each, and others, according to the part chiefly or alone affected. The former varieties are *Psoriasis guttata*, *P. diffusa*, *P. gyrata*, and *P. inveterata*; among the latter are *P. ophthalmica*, *P. palmaria*, &c.

Psoriasis guttata is a mild form of the disease, whilst *P. diffusa* is a more severe form. *P. inveterata* is only (as its name implies) a yet less curable form of the same disease. *P. gyrata* is a slight but very rare variety, distinguished by the patches occurring in stripes of a singularly tortuous or serpentine form.

Of the local varieties of *Psoriasis* the most interesting is that which occurs on the palms of the hands, and which, being most frequent in those who work with light powders and other irritating substances, is commonly called Bakers', or Bricklayers', or Washerwoman's Itch.

Psoriasis, in all its forms, is difficult of cure. The general condition of the health being corrected by the means that in each case seem appropriate, the remedy which is most frequently successful in cases of long standing is arsenic, in the form of from three to five drops of the Fowler's Solution, three times a day, for an adult. Active purging is also often useful, especially in recent cases and in young subjects. External remedies are generally of less value than internal. The most approved are vapour and sulphur baths, and ointments or lotions containing very small quantities of nitrate of mercury, or white precipitate, or kreasote, or alkalis. These however can only be employed in the later stages of the disease: in the earlier, the mildest fomentations give relief, and all kinds of irritants must be carefully avoided.

PSYCHE (Ψυχή). Apuleius is the first writer who relates the loves of Cupid and Psyche ('Metamorph.,' lib. iv., v.). According to his account, Psyche was the most lovely creature that the world ever beheld. People flocked from all parts to see her, and neglected the worship of Venus, who became in consequence so incensed against her, that she commanded her son to inspire Psyche with love for some vile creature. Cupid however, instead of obeying the commands of his mother, became enamoured with Psyche, and made her his wife. She was however subsequently deserted by him for disobeying certain injunctions which he had given her. Inconsolable at her loss, she wandered through the world in search of him, and after enduring many trials and sorrows, was at length united to him. Jupiter conferred upon her immortality, and her union with Cupid took place with the approbation of Venus and the other deities. A child was soon afterwards born to them, who was called Pleasure. It appears that the story of Cupid and Pysche must have been current before the time of Apuleius, as there are works of art which represent this subject, that are supposed to have been executed before the time of Apuleius.

Many writers consider the above tale an allegory, representing the union between the divine love and the human soul. The word Psyche signifies in Greek both 'soul' and a 'butterfly.' We frequently find in ancient works of art Cupid pressing Psyche to his bosom in the form of a butterfly.

PSYCHO'TRIA, a genus of plants belonging to the natural order *Cinchonaceæ* and the tribe *Coffeæ*. The *P. emetica* is the Ipecacuanha supplied by South America, and is the Striated Ipecacuanha of some authors. The root possesses similar qualities to those of Ipecacuanha. *P. noxia* is a native of Brazil, where it is accounted poisonous. *P. speciosa* is employed in Brazil in the same diseases as sarsaparilla; and *P. tinctoria* forms a fine red dye much valued in Peru.

PSYLLA (Geoffrey), a genus of insects belonging to the family *Aphidæ*, which, according to Latreille, forms the second family of the Homopterous *Hemiptera*.

The *Psyllæ* are minute insects, allied to those commonly called Plant-Lice, and live upon trees and plants, from which they derive their nutri-

ment by suction, and in so doing they often produce excrescences somewhat resembling gall-nuts, particularly on their leaves and buds. The species are very numerous, and are often named after the plants which they infest. Mr. Stephens records 26 species as natives of this country.

PSY'LLIUM, a name of a plant which occurs in Dioscorides. The plant, *Plantago Psyllium* of botanists, is common in the south of France. The seeds abound in a mucilaginous matter, and are employed as a demulcent, and for many of the same purposes as linseed tea is in this country. They are also employed by the manufacturers of muslins, and hence form an article of commerce in the south of France.

PSY'THIRUS, a genus of Hymenopterous insects of the family *Apidæ* and the division *Sociales*. It includes certain humble-bees structurally incapable of forming their own nests, and considered parasitic by St. Fargeau, the entomologist who established this genus.

PTA'RMICA, a genus of plants belonging to the natural order *Asteraceæ*. *P. vulgaris* has a widely-creeping root, very difficult to extirpate when the soil is moist. The whole plant is pungent, and provokes a flow of saliva. Its dried leaves produce sneezing, but this is thought to be owing to their little sharp marginal teeth; the root is aromatic.

PTARMIGAN. [TETRAONIDÆ.]

PTERIS, a genus of plants belonging to the natural order *Filices*. *P. aquilina*, Common Fern, or Bracken, is the most abundant of our British species. There is scarcely any wood, heath, or forest, in the United Kingdom, where this plant does not make its appearance. It is said to be indicative of poor soil, but it is more probable that its absence from cultivated ground is to be attributed to the effects of the hoe and the plough, rather than to the quality of the soil. The geographical range of this species is very extensive; it is included in every European list, and is found also in Asia and Africa. It is used in many parts of England and Scotland for manure, and in the Western Isles it is burnt for the sake of the alkaline ashes which it yields.

PTEROCARPUS, a genus of the natural order of *Leguminosæ*, containing many plants valuable for the nature of their products, and all of which are found indigenous in the tropical parts both of the Old and New World.

P. dalbergioides is a native of the Andaman Islands, where it grows to an immense size, and forms a valuable timber-tree, of which the wood is known as Andaman Red Wood, from its resemblance to mahogany; but it is redder, heavier, and coarser grained, though that of the root is finer than that of the stem. *P. Santalinus*, or Three-Leaved Pterocarpus, is a native of India, which yields the Red Sandal-Wood, or Saunder's-Wood of commerce, a substance long known for its employment in medicine. The wood from the centre of the tree is imported in large billets, which, when fresh, are of a brilliant red colour, but which gradually deepens by exposure to air, so that the outside becomes blackish-coloured. It is insipid, inodorous, and takes a fine polish, and may be distinguished from Brazil-Wood by the latter yielding its colour to water alone, whilst the Red Sandal-Wood barely tinges it.

Many of these trees exude a reddish-coloured juice which hardens into a kind of astringent gum. The name of Dragon's Blood has been applied to that from *P. draco*, a native of South America and the West India Islands, as well as to the similar product of several other trees, while that of *P. erinaceus* has long been considered to be the real Kino of the west coast of Africa.

P. Marsupium is another species, a native of the Circar Mountains of Hindustan, and grows to a large tree. It also exudes a red juice which hardens into a strong simply astringent gum of a dark red colour, so much resembling that of the *Butea frondosa*, that, according to Dr. Roxburgh, the same analysis might answer for both.

PTERODACTYLE (*Pterodactylus* of Cuvier; *Ornithocephalus* of Sömmering), a genus of fossil *Saurians*, whose type is entirely extinct.

To Collini, the director of the palatine museum at Mannheim, we are indebted for the first introduction of this Heteroclite. He described the skeleton of the long-billed species from a specimen, found at Aichstädt near Solenhofen, in that Museum, and figured it in the 'Memoirs of the Palatine Academy' ('Part. Phys.,' v. 58, et seq.)

Various and discordant were the theories put forth by Collini, Blumenbach, Prof. Hermann, Sömmering, and others, relative to the nature of those extinct creatures.

It was reserved for the penetrating eye and acute but patient investigation of Cuvier effectually to destroy these theories, supported though they were by weighty authorities: the satisfactory reasoning by which he disposes of them one after the other, and proves conclusively from the organization of the animal that it was a Saurian (in which opinion he was supported by Oken) will be found at large in the fifth volume of the last edition of his 'Ossemens Fossiles.' Our limits will not permit us to detail the links of the harmonious chain of his proofs; and we must here content ourselves with observing that the form of the *os quadratum* appears to have been the principal key by which the great French naturalist solved this intricate zoological puzzle, and detected its Saurian character. 'Behold,' says he, after having built, as it were, the animal before our eyes, 'an animal which, in its osteology, from its teeth to the end of its claws, offers all the characters of the Saurians; nor can we doubt that those characters existed in its integuments and soft parts—in its scales, its circulation, its generative organs. But it was at the same time an animal provided with the means of flight, which, when stationary, could not have made much use of its anterior extremities, even if it did not keep them always folded as birds keep their wings, which nevertheless might use its small anterior fingers to suspend itself from the branches of trees, but when at rest must have been ordinarily on its hind feet, like the birds again; and, also like them, must have carried its neck sub-erect and curved backwards, so that its enormous head should not interrupt its equilibrium.'

Dr. Buckland ('Bridgewater Treatise') ranks these flying reptiles among the most remarkable disclosures made by geology, and considers them as presenting more singular combinations of form than we find in any other creatures yet discovered amid the ruins of the ancient earth. He calls attention to the extraordinary discordance of opinion respecting a creature whose skeleton was almost entire, and observes that this discordance arose from the presence of characters apparently belonging to each of the three classes to which it was referred; the form of its head and length of the neck resembling that of birds, its wings approaching to the proportion and form of those of bats, and the body and tail approximating to that of ordinary mammalia. These characters, connected with a small skull, as is usual among reptiles, and a beak furnished with not less than sixty pointed teeth, presented, he remarks, a combination of apparent anomalies, which the genius of Cuvier reconciled. 'In his hands,' says the Professor, in continuation, 'this apparently monstrous production of the ancient world has been converted into one of the most beautiful examples yet afforded by comparative anatomy, of the harmony that pervades all nature in the adaptation of the same parts of the animal frame to infinitely-varied conditions of existence. In the case of the *Pterodactyle*, we have an extinct genus of the order *Saurians*, in the class of *Reptiles* (a class that now moves only on land or in the water), adapted by a peculiarity of structure to fly in the air. It will be interesting to see how the anterior extremity, which in the fore-leg of the modern lizard and crocodiles is an organ of locomotion on land, became converted into a membraniferous wing; and how far the other parts of the body are modified so as to fit the entire animal-machine for the functions of flight. The details of this inquiry will afford striking examples of numerical agreement, in the component bones of every limb, with those in the corresponding limbs of living lizards, and are at the same time illustrative of contrivances for the adjustment of the same organ to effect different ends.'

Dr. Buckland observes that we are already acquainted with eight species, varying from the size of a snipe to that of a cormorant.

Geological Position.—Lithographic limestone of the Jura formation at Aichstädt and Solenhofen, which abounds with remains of fish, and of brachyurous and macrurous crustaceans, and where *Xiphosuri* (*Limulus*) not unfrequently occur. The fish examined by Cuvier belonged, partially at least, to marine genera. He distinguished, for example, a well-characterised species of anchovy, probably *Clupea sprattiformis*, Bl. *Libellulæ* and other insects have also been found in the Solenhofen slate. The other localities are Lyme Regis (lias), Bantz, and Stonesfield (oolite).

Habits, Food, &c.—Cuvier, speaking of the Solenhofen district, observes that there is no doubt that at the time of the deposit of the lithographic slate, there lived in that canton crocodiles, *Limuli*, and other beings whose geographical distribution is now confined to the torrid zone, together with these flying Saurians, which flitted about by means of the membrane sustained by a single finger, suspended themselves and perhaps crept by the aid of the other three fingers, stood upon their hind legs only, and had their enormous gape armed with small pointed teeth, fit only for seizing insects and small animals.

Dr. Buckland thinks it probable that the Pterodactyle had the power of swimming so common in reptiles, and now possessed by the Vampire Bat of the island of Bonin.

PTEROLO'BIUM, a small genus of plants of the natural family of *Leguminosæ*. The genus is found in India as well as in Africa, and even the species *Kantuffa* occurs there, as it is the *Cæsalpinia lacerans* of Roxburgh, but referred to *Mimosa* by De Candolle, and called *M. Kantuffa*. Having been ascertained to be identical with the Indian plant, and belonging to this genus, it has been called *Pterolobium lacerans*. The genus contains only a few species of trees and climbing shrubs covered with strong sharp hooked prickles.

PTEROPHY'LLUM, a genus of fossil Cycadeous plants from the oolite of Yorkshire and beds of the same age in Scania. (Brongniart.)

PTERO'PODA, Cuvier's tenth class of Mollusks, *Aporobranchiata* of M. De Blainville, who divides the order into the *Thecosomes* and *Gymnosomes*.

The following genera compose Cuvier's *Pteropoda*:—1, *Clio*; 2, *Cymbulia*; 3, *Pneumodermon*; 4, *Limacina*; 5, *Hyalæa*; 6, *Cleodora*; 7, *Pyrgo*, described as a very small fossil shell, discovered by Defrance, globular, very delicate, and divided by a very narrow transversal slit.

PTEROSPERMUM, a small genus of plants of the natural family of *Byttneriaceæ*, which is found in the Indian isles and the southern parts of India. The flowers being large and the foliage showy, have induced the cultivation of the species as ornamental trees all over India.

I. PTOLEMÆUS (Πτολεμαῖος), surnamed SOTER, or 'preserver,' the founder of the dynasty of Greek kings in Egypt, frequently called the Lágidæ, was one of the ablest of the generals of Alexander the Great. He is commonly called the son of Lagus, but, according to the Macedonians, he was the son of Philip and grandson of Amyntas, but was called the son of Lagus, because his mother was given for wife to Lagus by Philip, though she was then with child.

In the division of the provinces on the death of Alexander, B.C. 323, Egypt was assigned to Ptolemæus, who erected it into an independent kingdom. He also added Cyréne and the surrounding country to his dominions. The defeat of Perdiccas, who invaded Egypt B.C. 321, and the subsequent defeat of Antigonus at the battle of Ipsus, B.C. 301, secured Ptolemæus in the quiet possession of Egypt.

The rest of the reign of this king was devoted to improving the condition of his kingdom. The city of Alexandria, founded by Alexander, became the first commercial city in the world, and the entrepôt of Indian products. Ptolemæus respected the religion of his Egyptian subjects, and contributed to the restoration of the ancient

monuments of the country. Many Jews settled in his dominions, and were allowed to have their synagogues. This king and his successors adopted certain Egyptian customs and religious practices, which they seem to have intended to unite as much as possible with the religion of the Greeks.

Ptolemæus was a patron of learned men, and himself an author. He wrote a history of the wars of Alexander, which, with the narration of Aristobúlus, supplied Arrian with the materials for his history. He invited learned Greeks to Egypt, without any distinction of religious or philosophical opinions, and he laid the foundation of the school of Alexandria.

The first wife of Ptolemæus was Eurýdice, the daughter of Antipater, by whom he had children; but he left his crown to a younger son, Ptolemæus Philadelphus, whom he had by Berenice. Ptolemæus assumed the title of king B.C. 306. He died B.C. 283, at the age of 84, according to Lucian. He had the character of being a wise, prudent, and generous prince.

II. PTOLEMÆUS, surnamed PHILADELPHUS, or the 'brother-loving,' succeeded his father, B.C. 283. He followed the example of his father in the encouragement of learning; and he maintained with great liberality many distinguished philosophers and poets, of whom the most celebrated were Theócritus, Lycóphron, and Callímachus. He established the public library, which was probably commenced by his father, and also founded a museum (μουσεῖον) for the promotion of learning and the support of learned men. The Museum contained among other apartments, a public theatre or lecture-room, and a hall where the learned and those who belonged to the museum dined together. Attached to the museum there were botanical and zoological gardens. The institution was enlarged by the Emperor Claudius.

Ptolemæus Philadelphus showed the same favour to the Jews as his father had done; and it was under his auspices that the Hebrew Bible was translated into Greek.

The resources of Philadelphus were very great. Much of the wealth which he acquired was, without doubt, owing to his possessing the trade with India and other parts of Eastern Asia. He also used every effort to extend the trade of Alexandria; he obtained possession of the maritime parts of Arabia and of the eastern coast of Africa, and his admiral Timósthenes appears to have gone as far south as Madagascar. (Vincent's 'Commerce and Navigation of the Ancients,' &c., vol. i., p. 42.) This king kept up an army of 200,000 men, besides 40,000 horse, and an immense fleet. He left his treasury full of money, and yet he was munificent in his expenditure. The first three Ptolemæi possessed Cœle-Syria and Cyprus.

In B.C. 274 Philadelphus sent an embassy to Rome, and formed an alliance with the republic. He died B.C. 247. His first wife was Arsínoe, the daughter of Lysimachus; and his second, his own sister Arsinoe. His marriage with his own sister was contrary to Greek but not to Egyptian usage. He had only children by his first wife—Berenice, Ptolemæus Euérgetes, and Lysimachus.

III. PTOLEMÆUS, surnamed EUE'RGETES, or the 'benefactor,' succeeded his father B.C. 247. He was engaged in war at the commencement of his reign with Seleucus Callinícus, to revenge the death of his sister Berenice; and he obtained possession of many of the provinces belonging to the Seleúcidæ. Seleucus tried to strengthen his power by entering into an alliance with his brother Antigonus Gonatas; but they became jealous of each other, and Ptolemæus availed himself of their dissensions to extend his kingdom.

We possess hardly any particulars respecting the life and character of Ptolemæus Euergetes. If inferior to his predecessors, he was superior to those that reigned after him. He followed his father's example in giving every encouragement to trade and commerce. It appears, from an inscription which was found at Adúle by Cosmas, that Ptolemæus had conquered Abyssinia, and that he maintained a powerful fleet in the Red Sea. A translation of this inscription, with many valuable remarks, is given in Dr. Vincent's 'Commerce and Navigation of the Ancients in the Indian Ocean,' vol. ii., p. 533, &c.

During the reign of Euergetes, Cleómenes, king of Sparta, took refuge in Egypt, and was received by him with great distinction.

Ptolemæus Euergetes married Berenice, the daughter of Magas, king of Cyréne. By her he had three children, Magas, Ptolemæus Philópator, and Arsinoe. He was murdered by his own son Philópator, B.C. 222.

Coin of Ptolemæus Euergetes.
British Museum. Actual Size. Silver.

IV. PTOLEMÆUS, surnamed PHILO'PATOR, or 'father-loving,' succeeded Euérgetes, B.C. 222. He was distinguished by his profligacy and cruelty, and is said to have been ironically called Philopator on account of having murdered his father. He seems to have had some military ability. He defeated Antiochus the Great at Raphia, near Gaza, B.C. 217; and Cœle-Syria and Palestine were ceded to him. He died B.C. 205.

V. PTOLEMÆUS, surnamed EPI'PHANES, or 'illustrious,' the son of Philopator and Arsinoe, was only five years old at the death of his father. Antiochus the Great thought it a favourable opportunity not only to recover Cœle-Syria, but also to obtain the sovereignty of Egypt, and accordingly united with Philip, king of Macedon, to divide the Egyptian dominions between them. The guardians of the young king took the precaution of placing him under the protection of the Romans.

When the Romans were engaged in their war with Philip, Antiochus attacked the dominions of Ptolemæus, and reduced, in B.C. 198, all the cities in Cœle-Syria. But as Antiochus was anxious to prosecute his conquests in Asia Minor, he proposed a treaty of marriage between his daughter and Ptolemæus, to be consummated when both came of age, by which Cœle-Syria and Palestine were to be given with the princess as a dowry. This marriage was celebrated in B.C. 192 or 193, when Ptolemæus was about seventeen years of age.

Ptolemæus died B.C. 181, and is said to have been poisoned. He left three children, P. Philométor, P. Physcon, and Cleopatra, who was successively married to her two brothers.

Coin of Ptolemæus Epiphanes.
British Museum. Actual Size. Gold.

VI. PTOLEMÆUS, surnamed PHILOMĒ'TOR, or 'mother-loving,' was a child when his father died; but the government was conducted by his mother Cleopatra. On her death, her brother Antiochus Epiphanes claimed Cœle-Syria and Palestine, which had been given to Ptolemæus Epiphanes as his wife's dower. In B.C. 171 Antiochus defeated the army of Philometor at Pelusium; and in the following year he took the principal towns of Egypt, with the exception of Alexandria, and obtained possession of Philometor, upon which the Alexandrines raised his brother to the throne, who took the name of Euérgetes II., but is more commonly known by the name of Physcon.

In B.C. 169 Antiochus invaded Egypt under pretence of restoring the kingdom to Philometor; and he would probably have taken Alexandria, if the Roman ambassadors had not commanded him to abandon the attempt. Antiochus retired from Egypt, leaving Philometor nominal king of the country with the exception of Alexandria. The two brothers agreed to divide the royal power between them, and turn their forces against Antiochus, who in B.C. 168 again invaded Egypt, and marched towards Alexandria. He was met within four miles of the city by the Roman ambassadors, who compelled him to depart from Egypt.

In the seventh year of their joint reign Philometor was driven from Egypt by Physcon, and took refuge in Rome. The senate restored him to his kingdom, and limited the dominions of Physcon to Cyréne. The two brothers were soon engaged in war for the possession of Cyprus, which Physcon wished to have. Physcon was defeated and taken prisoner by his brother, who allowed him to retain Cyréne.

In B.C. 151 Alexander Balas, with the assistance of Philométor and the kings of Pergamos and Cappadocia, was seated on the throne of Syria, and married Cleopatra (B.C. 150), the daughter of Philometor. But the king of Egypt shortly after took away his daughter from Balas, and married her to Demetrius II., to whom he gave Syria, of which he had taken possession. Philometor died B.C. 146 of the wounds which he received in a battle against Alexander Balas. Polybius gives Philometor a good character. He left an infant son, and another daughter Cleopatra, besides the Cleopatra who was the wife of Demetrius.

VII. PTOLEMÆUS, surnamed EUÉRGETES II., or PHYSCON, succeeded his brother B.C. 146, and commenced his reign by putting to death his brother's son. Physcon is represented by the ancient writers as a cruel and sensual tyrant. He derived his name of Physcon, or Big-Belly, from his unwieldy form. The portrait which Rosellini gives of Physcon, from the ancient monuments of Egypt, is that of a fat and sensual man.

He married Cleopatra, his own sister and his brother's widow, who bore him a son. He soon afterwards put away his sister, and married her younger daughter, his own niece, Cleopatra. He practised all kinds of cruelties upon his subjects, till Alexandria became almost deserted; but at length the people, in the sixteenth year of his reign, compelled him to fly to Cyprus; and the government was committed to Cleopatra, his sister and divorced wife. Physcon again obtained possession of the throne, which he held till his death, B.C. 117.

In the year B.C. 143 Scipio Africanus was sent at the head of a Roman embassy to Egypt, and was received with great pomp and respect by Physcon, who conducted him as far as Memphis.

Physcon, though a sensualist and a tyrant, was a patron of learning and the fine arts. He was a disciple of Aristarchus, and wrote an historical work, which is frequently referred to by Athenæus. Physcon had by his niece Cleopatra five children; two sons, Ptolemæus Soter and Alexander, and three daughters, Tryphæa, Cleopatra, and Seléne. He also left an illegitimate son, Ptolemæus Apion, who reigned at Cyrene, and bequeathed his kingdom to the Romans in B.C. 96.

VIII. PTOLEMÆUS, surnamed SOTER II., but more frequently called LATHY'RUS, succeeded his father Euergetes II., B.C. 117. He reigned together with his mother Cleopatra, who wished to have her younger son Alexander for her partner on the throne, but she was obliged by the people to select the elder. She always showed the greatest hostility to her eldest son, who is sometimes in consequence called ironically Philométor. At the commencement of his reign she compelled him to put away his sister Cleopatra, to whom he was married, and marry his youngest sister Seléne. She gave the island of Cyprus to her younger son, and after reigning ten years in conjunction with Lathyrus, at length raised an insurrection in Alexandria against him, which compelled him to leave Egypt. She per-

mitted him however to retire to Cyprus, after taking away from him his wife Selene; and she recalled her younger son Alexander to Egypt, and associated him with her in the government, B.C. 107.

In B.C. 89 Cleopatra was put to death by her favourite son Alexander, who wished to obtain the sole possession of the crown, but the people rose against him, and compelled him to flee from Egypt, and his brother Lathyrus was restored. He died B.C. 81, leaving a daughter, Berenice or Cleopatra, and two illegitimate sons, Ptolemæus Aulétes and Ptolemæus who reigned in Cyprus.

IX. PTOLEMÆUS, surnamed NEOS DIONY'SUS, 'the young Dionysus,' but more commonly AULE'TÈS, 'the piper,' was an illegitimate son of Lathyrus, and succeeded to the throne B.C. 81. His vices and low habits made him contemptible to his people, who expelled him from Alexandria in B.C. 58. He came to Rome in the same year, and on his way thither saw Cato at Rhodes. The Alexandrines placed upon the throne Berenice, the daughter of Auletes, and sent ambassadors to Rome to plead their cause against the king. Auletes however found means to gain over a large party in the senate. Cicero made a speech in his favour. In the following year, B.C. 57, the senate passed a decree for his restoration; but he was not restored until B.C. 55.

Berenice, whom the Alexandrines placed upon the throne, first married Seleucus, the pretended son of Antiochus Eúsebes, and afterwards Archeláus, the son of the Archelaus who had carried on war against Sulla. Auletes, on his restoration in B.C. 55, put to death both Archelaus and his daughter. Auletes survived his restoration about three years and a half, and died in May, B.C. 51. He left two sons, called Ptolemæus, and two daughters, Cleopatra and Arsinoe. [CLEOPATRA.]

PTOLEMÆUS, CLAUDIUS, a native of Egypt, lived at Alexandria in the first half of the second century of our æra, under the reigns of Hadrian and Antoninus Pius. Nothing more is known of his life except his works. He was an astronomer, chronologist, and geographer. His geography was for many centuries the text-book in that science for all the schools, and was superseded only in the 15th century, in consequence of new information derived from the discoveries of the Venetian, Portuguese, and other travellers and navigators.

Ptolemæus and Strabo followed a different method in their respective works. Strabo's work is a descriptive geography; that of Ptolemæus is a mathematical geography. Ptolemæus applies himself to fix the astronomical position of each place; he gives a bare list of names of mountains, rivers, and towns, with their respective longitude and latitude, without any description, or at least only a few words. He fixes the position of each place as if it were ascertained by astronomical observation. Ptolemæus availed himself of the labours of Eratósthenes, Hipparchus, and the other mathematicians of the Alexandrine school; but by adopting the method of Hipparchus in the projection of the map, he committed a material error in his longitudes, all of which he places too far to the east. Beginning from Calpe, he places it 5° E. of the Sacrum Promontorium of Iberia or Spain, an error of 1° 50′, and goes on increasing the excess of longitude as he advances to the eastward, making the length of the Mediterranean twenty degrees more than it is. He proceeds through Asia in the same way, till he places the mouths of the Ganges above forty-six degrees more to the eastward than the true position. Gosselin, at the end of his 'Géographie des Grecs analysée,' gives tables which show the difference between the positions of Ptolemæus and the true ones. Gosselin supposes that Ptolemæus was led into this material error by estimating the degree of longitude at 500 stadia at the equator, and at 400 stadia in the parallel of Rhodes; while Eratosthenes had reckoned the first at 700 stadia, and the second at 555. But Ptolemæus retained Eratosthenes' measure of 700 stadia for a degree of latitude, because he found that if he were to reckon the degree of latitude at 500, all his latitudes, several of which had been fixed by observation, would be too high; and that Alexandria, for instance, instead of being in 31°, would be in 43°, and Marseille in 60°. The different value given to the stadium by different geographers was a cause of much confusion. 'Eratosthenes,' says Gosselin, 'had fixed the distance between the Sacrum Promontorium of Spain and the eastern mouth of the Ganges at 70,000 stadia. These 70,000 stadia being reduced to degrees of 700 stadia each, give 100 degrees for the whole longitudinal distance, which is not far from the truth. But Ptolemæus, by taking his degree of longitude too small, made 146 degrees between the two points. But again, if we reduce these 146 degrees at the rate of 500 stadia each, we shall have about 73,000 stadia.' See also on this subject both Mannert and Ukert, in their respective works, entitled 'Geographie der Griechen und Römer.'

Dr. Brehmer, in his 'Entdeckungen im Alterthum,' 1822, pretends that Ptolemæus consulted some Phœnician charts, and he lays great stress upon the geographical knowledge of the ancient Phœnicians. Gosselin however, as well as Heeren ('Commentatio de Fontibus Geographicorum Ptolemæi,' &c., Göttingen, 1827), reject Brehmer's hypothesis: they reduce within very moderate dimensions the supposed geographical and astronomical knowledge of the Phœnicians, and trace the sources of the peculiar information of Ptolemæus to other quarters, and especially to the discoveries and conquests made by Roman commanders between the time of Augustus and the age of the Antonines, to the long peace which subsisted between the Romans and the Parthians under Hadrian and Antoninus Pius, and the flourishing commerce which was carried on during that period between the Roman Empire and the remotest parts of India. Marinus of Tyre, who lived about the year 100 of our æra, had written a geography and constructed maps of which Ptolemæus availed himself.

A good view of the known world of Ptolemæus, reduced to its real extent and position, is given by Gosselin, in a map at the end of the fourth

volume of his 'Recherches sur la Géographie Systématique et Positive des Anciens, pour servir de Base à l'Histoire de la Géographie Ancienne,' 4 vols. 4to., Paris, 1813.

The latter part of book vii. and book viii. of Ptolemæus are a recapitulation of his system, with a description of the maps, twenty-six in number, which accompanied the work, namely, ten for Europe, four for Africa, and twelve for Asia.

Several editions of the Geography of Ptolemæus, translated into Latin, appeared in the 15th century. Among the best are those of Rome, 1478 and 1490. The Greek text was first printed at Basel in 1535, under the care of Erasmus. The Abbé Halma published at Paris, 1828, the first book of Ptolemæus in the Greek text with a French translation, accompanied by a Memoir 'On the Measures of the Ancients.'

PTOLEMAIC SYSTEM. A few words of general explanation are all that can be given under this head, and we are not now speaking with particular reference to Ptolemæus (whose part in the matter is noticed under SYNTAXIS), but of the astronomical part of that system which, founded on early metaphysical and physical doctrines adopted by Plato and Aristotle, reinforced by mathematical hypothesis drawn from Hipparchus and Ptolemæus, received by the Mohammedans, and by them imparted to the Christians of the middle ages, was the doctrine universally established in Europe till the 17th century. As a whole it combines the physics of the Aristotelian school, the geometry of Euclid and his successors, the sexagesimal arithmetic of the Greeks, and the astronomy of Hipparchus and Ptolemæus with some slight additions from later names. The geometry remains; the arithmetic has been supplanted by the decimal system of the Hindoos; the physics and astronomy stood and fell together; and as under the words Ptolemaic System the astronomy is particularly meant, we only here notice the physical notions so far as they are connected with it.

The early separation of perceptible matter into the four elements of earth, water, air, and fire, with observation of the relative places they appear to assume, led to the formation of an elementary system. Earth (and solids generally) sink in water, while air rises in water, and flame in air. Hence the notion that the mass of the earth is the central body of the universe; above is a region of water, through which rises that portion of earth on which men and animals live. Above this is a region of air, and above this again a region of fire. Nothing is at rest until it arrives at its proper or natural place, and all the motions of a part separated from its whole are rectilinear; fire rises, and bodies fall, in straight lines. Gravity and levity are only the efforts of bodies separated from their natural places to return to them.

Above the earth and the elementary zones which encompass it are other successive zones, called heavens. Each heaven contains an immense crystal spherical surface, to which one of the heavenly luminaries is attached, or would be attached, if it moved uniformly in a circle, as it would then do if the crystal sphere were made to revolve uniformly. But the varied motions of the heavenly bodies made it necessary that smaller orbs should be placed with their centres upon the larger ones, and that the planets should move with the smaller ones. It is hardly to be believed that Ptolemæus and the mathematicians received these orbs, in the physical sense, or as anything but hypothesis for representing the actual motions of the planets. It is certain however that the actual solid orbs continued to be received till a late period.

The first heaven is that of the moon; the second that of Mercury; the third that of Venus; the fourth that of the Sun; the fifth that of Mars; the sixth that of Jupiter; the seventh that of Saturn; the eighth that of all the fixed stars. The heavens of Aristotle end here. Later theorists add two more, a ninth, to make the precession of the equinoxes, and a tenth, or primum mobile, to make the diurnal revolution. All beyond this is the empyreal heaven.

The office of the primum mobile is to revolve from east to west in twenty-four hours, carrying with it (but how, we do not know) the whole of the subordinate heavens, and making all the phenomena of day and night. All the heavenly motions are to be circular and uniform. This doctrine of the Platonic School is the keystone of the whole system. The poles of the primum mobile are those of the equator; but the ninth heaven moves slowly round the poles of the ecliptic, carrying the whole system forward in longitude, so as to give the phenomena arising from the precession of the equinoxes. The heavens of the other heavenly bodies move round with the mean motions of the bodies depending upon them; and this completes the general view of the system.

The details of the heavenly motions were for the mathematicians only, who dropped the orbs, and only took such circles out of them as were necessary in the explanation of the motions.

Ptolemæus succeeds in giving a tolerable account of the angular motions known in his time; but he fails in placing the planet at the right distance from the earth, though he may place it nearly in the right longitude.

PTOSIS is a dropping of the upper eyelid, which the patient cannot by any voluntary exertion raise from before the globe of the eye. In some cases this effect is produced by great inflammatory swelling of the eyelid, with effusion of serum into its tissue; but in those cases to which the name of ptosis is more especially applied, it results from a paralysis of the third pair of nerves, or only of that branch of it which supplies the levator palpebræ muscle.

PTY'CHOGENS are those Endogenous plants whose leaves are occupied by veins running side by side from the base to the apex, without irregular division, as in grasses, lilies, &c. The name has been given in contradistinction to *Dictyogens*, which are those Endogens that, like *Smilax*, have the reticulated veins of Exogens.

PTYCHOPLEURES, the name used by MM. Duméril and Bibron to designate a subfamily of

the *Chalcidians* or *Cyclosaurs*, the seventh family of Saurians according to their arrangement. The other subfamily of the Chalcidians is named by them the *Glyptoderms*.

The Ptychopleures have the body covered with true scales, which are little or not at all imbricated, and distributed regularly in rings around the body, which is thus as it were circled. Most frequently there is a depression or furrow (sillon) throughout the length of the trunk, and which separates the sides of the abdominal region.

PTYCHO'TIS, a small genus of Umbelliferous plants, of which the seeds of some of the East Indian species have formed articles of condiment and of medicine from very early times. The European species are not remarkable for any useful properties, but *P. Coptica* and *P. Ajowan* probably yielded the seeds which formed the *Ammi* of the ancients.

PUBERTY. [AGE, i. 231.]

PUBLIC HEALTH. A reference has been made to this head from HEALTH, PUBLIC; but, in order to give the latest results, the article has been deferred to TOWNS, HEALTH OF.

PUBLICA'NI. The Publicani were a body of persons in the Roman state who farmed the public revenues (vectigalia), from which circumstance apparently their name is derived. ('Dig.' 39, tit. 4, s. 12.) They were numerous as early as the sixth century of the Republic, and they continued to exist under the Emperors. The publicani formed various societies or partnerships. The persons who were members of these societies were chiefly of the equestrian order, and the whole body was so numerous and wealthy as almost to constitute a separate class in the state. Each societas had a magister, or chief manager, at Rome, and a deputy manager (pro magistro), with numerous associates and assistants, in the provinces. The revenues, which were chiefly leased to the publicani, were tolls, harbour duties, and the scriptura, or the tax that was paid for the use of the public pasture-lands. The publicani had their underlessees (portitores, τελῶναι, Luke v. 27, 29) and collectors. In our translation of the New Testament these inferior officers are called 'publicans,' and are mentioned together with 'sinners'). It appears that Matthew, who was a Jew, was a publican (Matth. ix. 9), from which circumstance, and from all reasonable probability, it may be concluded that natives of a province were employed as collectors, and probably farmed the revenues of small districts from the great Roman publicani.

The publicani undertook to pay fixed sums for the taxes of a particular district or place. The contract was often made by a single person on behalf of himself and others. It was the business of the censors to let the taxes. The publicani gave security to the state for the due performance of their contract; and their property, as well as that of their sureties, was liable to the amount of their obligations.

PUBLI'COLA, PU'BLIUS VALE'RIUS. His original name was Publius Valerius, and the surname Publicola was given to him as a distinction for his republican virtues. He was of Sabine origin, and the son of Volesus. Shortly before the expulsion of the Tarquins, he went from Rome to Collatia with Sp. Lucretius to avenge the violence done to Lucretia. He assisted Brutus in effecting the banishment of the Tarquins; and after the establishment of the consulate, when Tarquinius Collatinus had resigned his office, P. Valerius was appointed consul in his stead. In the ensuing war of the Tarquins, Valerius commanded the Roman infantry, and gained a great victory near the forest of Arsia (B.C. 509); Brutus, his colleague, fell in the battle. Valerius, with the spoils of the enemy, returned to Rome in triumph. Valerius remained sole consul. He filled up the vacancies in the senate which had occurred during the late revolution; and he carried several laws, the object of which was to prevent the restoration of kingly power. He also secured to the plebeians an appeal to a tribunal of their own order from a sentence pronounced by a consul which inflicted bodily punishment. A consul was at length elected, Sp. Lucretius, who, being at a very advanced age, died a few days after, and in his place was elected M. Horatius Pulvillus, who at the close of the year was re-elected to the consulship along with P. Valerius (508 B.C.). In the war with Porsena and the Etruscans, which broke out this year, Publicola and his colleague were wounded, and the Romans retreated across the Tiber, within the city. But Publicola subsequently made great havoc among the Etruscans by a stratagem. The census of Publicola, at which 130,000 adult Romans were registered, is said to have taken place in the second consulship of Publicola. He was consul a third time with P. Lucretius (507 B.C.). He was made consul for a fourth time during a war with the Sabines. He died shortly after, and was buried at the public expense: the Roman matrons mourned for him a whole year.

PU'BLIUS, SYRUS, a native of Syria, was brought when a boy to Rome as a slave, but he met with a kind master who took care of his education, and gave him his freedom. He excelled in writing Mimi, which were in great vogue at Rome in the later times of the republic. Publius appears to have been more correct and moral in his writings than authors of Mimi generally were. St. Jerome ('Epistola ad Lætum') says that the Romans used to read his works in their public schools. His works are lost, but several of his moral apophthegms, which have been preserved by Seneca, Gellius, and other ancient writers, are remarkable for laconic precision and justness of thought. They have been collected and printed at the end of several editions of Phædrus.

PUCCI'NIA, a genus of Fungi well known to farmers under the name of Mildew. A considerable number of species have been distinguished by writers on fungi, and thirty-eight are enumerated as inhabitants of this country. They all grow upon the living leaves or stems of plants, and are generated in their interior, bursting through the epidermis when ready to scatter their seeds or spores. By what means the latter are introduced into the tissue has never been satisfactorily explained: some writers imagine the seeds to be introduced through the stomates from the

atmosphere where they float; but it seems more probable that they are absorbed by the young roots, and carried upwards in the current of vegetation, a mode of introduction which their extremely small size renders quite possible. The Mildew of corn is the *Puccinia graminis*, which makes its appearance on the straw and leaves in the form of dark gray or black lines and patches, broken in outline in consequence of their running irregularly together.

PUDDING-STONE. [CONGLOMERATE.]

PUDDLING. [CANAL.]

PUEBLO. [MEXICO.]

PUERPERAL DISEASES. Under this term are included all those diseases which arise out of the state of pregnancy: they are not however, as the name would seem to imply, peculiar to this condition, but incidental only; and they are so far modified by it as to require some allusion to their character and mode of treatment.

Puerperal Convulsions. These consist of epileptic seizures, and their character differs in no respect from the ordinary epileptic fits. [EPILEPSY.] When they occur after delivery, they are generally connected with a loaded state of the large intestine, or with a state of exhaustion from hæmorrhage. The treatment is obvious, and consists in relieving the vascular system by general and topical bleeding; and unloading the intestines by cathartics when the first is the cause, and giving stimulants when the second state is present.

Puerperal Peritonitis, called also Puerperal Inflammation and Puerperal Fever. It usually attacks women a few days after delivery, and seems to have no connection with the duration or the severity of labour. This fatal disease varies so much in the type of the inflammation as to be scarcely recognised as the same affection in different individuals and at different periods, the accompanying fever being sometimes strictly inflammatory, and at other times typhoid. In its most dangerous form it is characterised by a remarkable prostration of the vital powers, and by a countenance expressive of extreme anxiety and distress. The pulse is frequent and feeble; the abdomen tympanitic, and unable to bear the slightest pressure; the bowels are constipated, and vomiting is not an unfrequent attendant. This severe form of puerperal fever is most frequently epidemic, and many believe it to be highly contagious. The treatment of puerperal fever is peculiarly difficult. 'Every case,' observes one of our most celebrated accoucheurs, 'must be isolated and studied alone, and looked at by itself, and its management must depend upon its type and its stage.' Bleeding, general and topical; counter-irritation, by means of blisters or spirits of turpentine, applied to the abdomen; purging, by the exhibition of the last-named medicine, or by large doses of calomel; and the latter, given to excite ptyalism, have been the principal remedies used for combating this formidable malady. A form of disease sometimes occurs after delivery, which simulates the preceding, but is not inflammatory. It arises from intestinal irritation, and requires a much less active mode of treatment. In most cases purgatives are demanded.

Puerperal Insanity, or *Puerperal Mania*. It comes on rather insidiously. There is a little excitement during the day, and sleeplessness at night; then delirium, and then actual mania; the pulse is somewhat accelerated, the tongue furred, the skin hot, the bowels costive, and the secretion of milk diminished. It seems to arise from a combination of causes acting upon an originally irritable temperament, but rendered still more so by intestinal disorder and hæmorrhage, or by the debility consequent upon suckling. Blood-letting in these cases is generally fatal; the treatment consists in regulating the bowels, and preserving extreme quiet of mind and body, with a nutritious but not stimulating diet.

Uterine and Crural Phlebitis has been described under the terms of *Phlegmasia dolens*, *Œdema Puerperarum*, the White Swelling of lying-in women, &c. It may appear as early as the fourth day after delivery; but, in the majority of cases, it is not till the second or third week that it makes its appearance; and, in many instances, attacks women who are recovering from puerperal fever. It is ushered in with rigors, and these are succeeded by heat, thirst, and other symptoms of pyrexia. There is a sense of pain, first experienced in the uterine region, and gradually descending in the course of the iliac and crural veins down one leg, accompanied by swelling, and great tenderness upon pressure along the course of the vessels; which are hard as a cord, and roll under the fingers. In some cases an erythematous redness of the integuments of the limb is met with; but in the majority they are smooth, shining, tense, and colourless. The power of moving the limb is completely lost; and it is greatly and uniformly swollen throughout its whole extent. The treatment of *Phlegmasia dolens* consists in the local abstraction of blood by leeches applied to the groin, and in the course of the large venous trunks of the limb; hot fomentations to the part; and the administration of diaphoretics and saline purgatives.

Anæmia is a frequent disease of parturition from loss of blood. It is characterised by a pallid condition of the skin; great nervous excitability; a throbbing of the temples; vertigo; tinnitus aurium; a frequent, jerking, compressible pulse; a great tendency to faint on the slightest exertion, or in the upright position; palpitation of the heart; halitant respiration; and generally great thirst. The treatment to be adopted in *Anæmia* from loss of blood consists in maintaining a perfect quiet of mind and body, in a free exposure of the patient to fresh air, a mild but nutritive diet, and a regular but not an over-active state of the bowels.

Milk Abscesses arise from the inflammation consequent on over-distension of the lactiferous tubes, and require the same mode of treatment as is adopted in abscess when it occurs in other parts than the breast. They are best prevented by permitting the infant to suck within a few hours after delivery, and by repeating this act frequently. When the secretion of milk is excessive, the bowels should be kept freely open by saline purgatives.

PUERTO BELLA. [PANAMA.]

PUERTO-CABELLO, a town and port in the province of Carabobo, in the republic of Venezuela in South America, is situated in 10° 20′ N. lat., 69° 10′ W. long., and has about 10,000 inhabitants. It is considered the best port on the south coast of the Caribbean Sea. A narrow low island extends about two miles E. and W., overgrown with mangrove-trees, and at its eastern extremity united to the continent by a shoal. To the south of this island is the harbour, which is formed on the west by a peninsula projecting northward and terminating about 100 yards from the island. The space between the peninsula and island forms the entrance of the port, which is deep, but so narrow that only one vessel can pass through it at a time. The harbour is deep and spacious, and the largest vessels may lie there in safety; for though a heavy surf breaks along the coast, its force is broken by the intervening island, and as the entrance of the harbour is from the west, the surf does not penetrate to the interior. The town consists of two parts—the city and the suburb. The city is situated on the northern part of the peninsula, through which a cut has been made, by which its site is converted into an island. It is small, but contains several good houses, and is well fortified. There are good warehouses, and an excellent wharf faced with stone. Vessels of large burden lie close to the wharf, and as they can be easily and securely fastened to the shore, anchors are seldom required. Over the cut which separates the city from the suburb is a fortified wooden bridge, the gate of which is shut every night. The suburb is much more extensive than the city. The commerce of the town is considerable, as it is the main outlet for the produce of Venezuela. The exports consist of cacao, coffee, sugar, mules, &c.

PUERTO DE LA MAR. [ATACAMA.]

PUERTO DE NAOS. [NAVY BAY.]

PUERTO-DE-SANTA-MARIA is a large seaport of Spain, situated 5 miles N.E. of Cadiz, at the mouth of the Guadalete, in 36° 31′ 8″ N. lat., 6° 18′ W. long., and has about 18,000 inhabitants. The town is well built, well paved, and very clean. The Calle-Larga, a street about a mile in length, has a very handsome appearance, owing to the number of fine shops and elegant buildings which it contains. The quay is well contrived, but large ships cannot come up to it, on account of the bar at the mouth of the river. On the west side of the town there is a very fine prospect of the bay and town of Cadiz. The climate is excellent, for which reason the wealthy inhabitants of Cadiz reside here during the summer. The only manufacture of consequence is soap, of which large quantities are exported. There are also a few manufactories of hats, and one or two brandy-distilleries. This town is the principal depôt for the wines of Xeres, the export of which is managed chiefly by French and English merchants, many of whom are resident in the town. There is communication with Cadiz by small steamers and by carriages that make the land circuit.

PUERTO-REAL, a town of about 6000 inhabitants, in the south-west of Spain, 5 miles E. of Cadiz, and on the bay of Cadiz. The streets are airy, clean, and straight, and the houses well built, with flat roofs. The market-place, which is situated in the centre of the town, is a spacious square surrounded by stone arcades, under which all sorts of provisions are exposed for sale. There is also a very handsome stone pier and several commodious wharfs of the same material for the unlading of ships. Close to one of the latter is a large reservoir, from which water is daily conveyed to Cadiz for the supply of the town and the ships in the bay.

PUERTO RICO, an island of the West Indies, belonging to Spain, is the smallest of the Greater Antilles, and the most western of the Leeward Islands. Its form is a parallelogram, 84 miles long and 35 broad. It lies between 17° 50′ and 18° 30′ N. lat., and 65° 39′ and 67° 11′ W. long. The population is about 500,000.

A range of mountains of considerable height runs through the centre of the island; the highest part is that of Luguilla in the north-east. The Yungue, the most elevated peak, is about 3700 feet high. From the central chain many inferior ridges run north and south, containing between them valleys of great fertility watered by rivers. The coast abounds with harbours: the chief of which are San Juan, Aguadilla, Guanica, and Jobos. The chief rivers, Manati, Loisa, Trabajo, and Arecibo, are deep and broad.

The soil of Puerto Rico is of the richest and most varied description. The produce of sugar is very abundant; and tropical productions in general are plentiful. The island exported in the first 10 months of 1849 — 98,000,000 lbs. of sugar; 4,475,000 lbs. of molasses; 6,703,161 lbs. of coffee; and 1,702,000 lbs. of tobacco. There is good pasturage for horned cattle, many of which are reared. The climate is healthy.

Puerto Rico was discovered by Columbus in 1493. The Spaniards extirpated nearly all the natives; and the few remaining have intermixed with the Europeans, so that there is very little distinction of races.

The island now contains about 60 towns and villages. *San Juan*, the capital, is built on a narrow island, connected at one end with the mainland by a bridge. The town is placed on the slope of a hill, and has regularly-built streets, which cross each other at right angles. It is enclosed by strong fortifications, and contains about 30,000 inhabitants. The chief public buildings are the cathedral, six churches and chapels, a theatre, military hospital, another for females, a gaol, a house of correction, a town-house, which is a handsome building, an arsenal, and a custom-house.

Mayagues and Aguadilla on the west, Ponce on the south, Humacao on the east, and Pepino and Cayey in the interior, are considerable towns. The rest are very small, consisting generally of a large square, with a church and a few straggling houses.

PUFENDORF, SAMUEL, was born in 1632, at the small town of Chemnitz in Saxony, in the neighbourhood of which place his father was settled as a Lutheran clergyman. He received the rudi-

ments of his education at Grimma, and from Grimma he was removed to the university of Leipzig where he studied theology for several years. Accident and the tendency of his mind led him while at Leipzig to change his course of study, and about the year 1656 he went to the university of Jena, where he devoted himself to the study of mathematics. About the same time Pufendorf appears to have first applied himself to the Law of Nature, on which subject he became a distinguished writer.

His first work appeared at the Hague in 1660, under the title of 'Elementa Jurisprudentiæ Universalis.' The work was dedicated to the Elector Palatine, who, having founded at Heidelberg a Professorship of the Law of Nature and Nations, gave the chair to Pufendorf, and also entrusted him with the education of his own son (A.D. 1661). Pufendorf's lectures attracted a numerous audience. During his residence at Heidelberg Pufendorf wrote a work on the constitution of the Germanic Empire, in which he pointed out the incongruities and defects of this political system, and suggested remedies for abuses. The work was printed at Geneva under a fictitious name, and attracted great attention. But it was known to be Pufendorf's, and it excited hostility against him on the part of some of the German civilians and the more powerful members of the Germanic body.

Pufendorf gladly accepted in 1770 an invitation from Charles XI. of Sweden, who gave him the chair of the Law of Nations in the newly-established university of Lunden. At Lunden he published the work on which his reputation is founded, 'De Jure Naturæ et Gentium.' It is a work of merit, and a valuable contribution to the principles of jurisprudence. The French translation by Barbeyrac has many valuable notes. The King of Sweden made Pufendorf his historiographer and gave him the title of councillor of state. In 1688 the Elector of Brandenburg, Frederick William, invited Pufendorf to Berlin, with the consent of the King of Sweden, for the purpose of writing the history of his life and reign. He died at Berlin, in October, 1694. Pufendorf's historical works have no great reputation, and though a voluminous writer he is now chiefly remembered through his treatise 'De Jure Naturæ et Gentium,' which itself is perhaps more cited than read, and is often appealed to as an authority in matters which might be as well settled without it.

PUFF BALL. [Lycoperdon.]

PUFF-BIRD. [Barbets.]

PUFFIN. [Auk; Petrels.]

PUG, a dwarf variety of the dog, somewhat resembling a mastiff or bull-dog in miniature. The Dutch Pugs have more the aspect of the large varieties last named than the French Pugs, some of which latter are very small. Both are snappish and noisy, but capable of strong attachment to their masters or mistresses. The French Pugs are docile, and may be easily taught many amusing tricks.

PUG-MILL. [Brick.]

PUGET, PIERRE, was born, in 1622, at Marseille. He received his first instructions in art from his father, who placed him under a shipwright to learn to carve the ornaments used in vessels. Disgusted with the drudgery of such workmanship, he set out for Italy, and passed a considerable time at Florence and Rome, where he studied, and practised as a painter, a sculptor, and an architect.

His talents afterwards met with employment at Toulon and Marseille, for which latter city he projected many embellishments, and he gave proof of his skill in engineering by various machines and inventions which he introduced into the marine at Toulon.

He was sent by Fouquet to Genoa for the purpose of selecting marble for some of the works proposed to be executed at Marseille; but that minister being shortly afterwards disgraced, Puget remained at Genoa, where he produced the two statues of San Sebastian and San Ambrosius, and the grand bas-relief of the Assumption, in the chapel of the Albergo de' Poveri. At length he was recalled to Paris by Colbert, who obtained for him a pension of twelve hundred crowns. He was not however to be attached to a court, even by the compliments of Louis XIV. himself, but he retired to Marseille, where he died, Dec. 2, 1694. The Milo of Crotona, at Versailles, is generally considered to be the chef-d'œuvre of his chisel.

PU'GLIA, the ancient *Apulia*, is the name given to a large division of the kingdom of Naples, which lies east of the Apennines, and extends to the Adriatic Sea. It comprises the three provinces of Capitanata, Bari (Terra di), and Otranto (Terra di).

PU'LCI, LUI'GI, born at Florence in 1431, of a respectable though poor family, became early in life acquainted with the family of Medici, through which he seems to have obtained an inferior office under the Florentine republic. Few particulars of his life are known. He was a welcome guest at the table of Lorenzo de' Medici, who relished his wit and his extempore poetical effusions. Lucrezia Tornabuoni, Lorenzo's mother, urged Pulci to write an epic poem. Pulci undertook the task, and took for the subject of his poem the treachery of Gano of Maganza, one of Charlemagne's vassals, who is reported in the old legends to have brought about the defeat of the French at Roncesvalles in the Pyrenees. His poem is not, as has been supposed by many, a burlesque poem, but a combination of the serious with the facetious; it is a romance accompanied by its own parody. The title of 'Morgante Maggiore' is a capricious one, for the giant whom he introduces by the name of Morgante is only a subordinate character, and acts as squire to Orlando. The reason of the adjunct 'Maggiore' is not perceived, unless it was given to him on account of his great strength.

The first edition of the poem of Pulci, with all its freedom of thought and expression, came out in 1481, from the press of the convent of Ripoli, at Florence, in which some of the nuns acted as compositors, and were paid accordingly. ('Notizie Istoriche sopra la Stamperia di Ripoli,' by Father Vincenzo Fineschi, Domenicano, Florence, 1781.) The edition of the 'Morgante,' Naples, 1782, contains a good biography of the author.

Pulci wrote also a number of satirical and some licentious sonnets, and other light poetry, including his 'Confession,' the copies of which are rather scarce. Pulci died at Florence in 1487.

PULEX, the name given by Linnæus to a group of insects of which the common Flea may be regarded as the type. The fleas are considered by Latreille, Kirby, and many other entomologists, as constituting an order of insects. They form the group *Suctoria* of De Geer; the order *Siphonaptera* of Latreille, and *Aphaniptera* of Kirby and Spence, by whom they are placed between the orders *Diptera* and *Aptera*. In the 'Règne Animal' they are arranged between the orders *Parasita* or *Anaplura* of Leach, and the *Coleoptera*. It is highly probable however that when this group is better known—when the numerous insects allied to the fleas are more common in our cabinets—it will be found that they do not constitute an order by themselves, but are aberrant forms of other well-established orders.

The common Flea (*Pulex irritans*) is but too well known. It is said to attack dogs, cats, and other animals, as well as man; but there are other species which appear to be peculiar to certain birds and quadrupeds, and these have received in most cases the names of the species they attack, such as the Dog Flea (*Pulex Canis*), the Mole Flea (*P. Talpæ*), that of the Martins (*P. Hirundinis*), and of the Mouse (*P. Musculi*), &c.

The Chigoe of the West Indies and South America also belongs to this group, being the *Pulex penetrans* of authors.

PULGAR, HERNANDO DEL, was probably born at Pulgar, a village near Toledo, about 1436. After he had served as page to John II. of Castile, and as secretary to Henry IV., his successor, Queen Isabella, in 1482, named him national historiographer. From his situation at the court he must have had access to the most ample and accredited sources of information; and the portion of his 'Cronica de los Reyes Catolicos Don Fernando y Doña Isabel' subsequent to 1482, may be received as perfectly authentic, and has all the character of impartiality. His Chronicle was first printed at Valladolid, in 1565. Pulgar left some other works, of which his Commentary on the 'Coplas de Mingo Revulgo,' a poetical satire, in the form of a dialogue between two shepherds, describing the court of John II., his 'Letters,' and his 'Claros Varones,' or sketches of illustrious men, have alone been published.

Some bibliographers have confounded this Pulgar with Hernan Perez del Pulgar, a distinguished officer in the war of Granada, and who is supposed to be the author of a Chronicle of Gonzalo de Cordova, Alcalá, 1584, fol., as well as of a translation of a French historical work, entitled, 'La Mer des Histoires,' which appeared at Valladolid, in 1512, fol., under the title of 'Mar de Historias.'

The year of Pulgar's death has not been ascertained: it is probable that he did not survive the capture of Granada by Ferdinand and Isabella, as his history falls somewhat short of that event.

PULICA'RIA, a genus of plants belonging to the natural order *Asteraceæ*. *P. vulgaris* is the *Inula* of Linnæus. It is found on moist sandy heaths in Great Britain. This species is the common Flea-Bane; so called from its being disliked by vermin and used to drive away fleas. *P. dysenterica* is the plant which is stated by Linnæus, on the authority of General Keith, to have cured the Russian army of the dysentery. Haller however speaks contemptuously of the medicinal virtues of this plant. It is found in damp places in Great Britain.

PULLEY. The pulley is one of the simple machines or mechanical powers employed in the construction of machinery and in the transmission and modification of force. The kinds of pulley in use are very numerous; but they all consist of combinations of a grooved wheel, moveable on an axis, and a rope lying in the groove; and the manner in which this rope passes over and under a system of these wheels, so as to connect the force with the resistance, or the power with the weight, determines the species of kind of pulley. The following are the combinations by which the principle of pullies is put in practice:—

The single fixed pulley possesses no mechanical advantage, the power and the weight being equal to each other.

The single movable pulley consists of one wheel fixed and the other movable; the power acts at one end of the rope, and the other end is fixed to an immovable obstacle; the weight or resistance is attached to the sheave, or block, of the movable wheel. In this the power is one-half the resistance when there is equilibrium.

The first system of pulleys consists of an upper and lower set of wheels, called the upper and lower block; the upper being fixed, and the lower, to which the resistance or weight is attached, being movable. The power is to the weight or resistance as unity to twice the number of wheels in the lower block. A system consisting of one fixed and two movable pullies is called a Spanish Barton.

Smeaton's Tack, so called after the celebrated engineer of that name, contains two tiers of wheels, one above the other, in each block. This arrangement is ingenious; but it is attended with great friction and inequality of wear.

White's Pulley consists of a single wheel in each of the two blocks. The wheel has a conical form, with grooves on its convex surface; and the diameters of the grooves are in arithmetical progression, by which they revolve with velocities equal to that of the line passing over them. The advantage is that the friction is reduced to that of the pivot and the two lateral faces.

There are two systems in which each block contains a single pulley, and has a separate string. In one system the string is made fast at one end to the block next above it, and at the other to an immovable object. In the other system each string is attached to the weight. These are superior to the other systems, with respect to the ratio of the resistance to the moving power, but they are of no practical use.

PULMOBRANCHIATA, M. de Blainville's name for his first order of his second subclass (*Paracephalophora Monoica*) of his *Malacozoœ*. Cuvier had previously named his first order of

gastropodous Mollusks *Pulmonés*, from the circumstance of their breathing air. He divides them into two sections, 1, *Pulmonés Terrestres;* 2, *Pulmonés Aquatiques*. See Cuvier's 'Règne Animal.'

PULMOGRADA, an order of the class *Acalephæ*, according to Cuvier, embracing the great genus *Medusa* of Linnæus, with its subgenera *Porpita* and *Velella*.

These singular creatures, floating masses of a gelatinous consistence, are all marine, and often attract the notice of those who walk on the shore. They may be characterised as having a disk more or less convex above, similar to that of a mushroom, and called the *umbrella*. Its contractions and dilatations concur to the motility of the animal. The edges of this umbrella, as well as the mouth, or the suckers, more or less prolonged into pedicles which take its place, in the middle of the lower surface, are furnished with tentacles of very different form and size. These different degrees of complication have given rise to very numerous divisions. For these we refer the reader to the 'Règne Animal.'

In these animals no nerves have been satisfactorily demonstrated, yet they appear to possess the sense of touch, chiefly in the tentacles and cirrhi, with which most of the *Medusæ* are furnished; and they are sensible to light. Probably nervous matter is diffused through their delicate tissues, or resides at least in the tentacles. Their food consists of small fishes and marine worms, &c., which by some not well-known process; probably by the contractions of the tentacles, aided by the umbrella-like movements of the disk, are forced into the mouth. They most likely possess the power of paralysing their prey. Respiration is carried on by means of a network of delicate vessels, forming a ring round the disk; this network is formed by lateral ramifications of straight vessels diverging from the central cavity of stomach to the circumference of the disk, at a little distance from each other. The reproduction of these animals is involved in much mystery. Milne Edwards has proved that some of the *Pulmograda* at least are diæceous: are in fact of different sexes; and Siebolt has traced the development of the ova in the sac of the female. Some species possess marsupial receptacles for the ova, in the form of a series of small flask-shaped processes developed from each side of the oval tentacles. Many of the Medusæ are luminous.

Different zoologists adopt various arrangements of these marine animals; that of Péron and Lesueur deserves the attention of the student, although, as Cuvier observes, they have established genera on the authority of the bad figures of inaccurate authors. The genera are very numerous, and spread through all seas. [Acalephæ; Ciliograda.]

PULMONA'RIA, a genus of plants belonging to the natural order *Boraginaceæ*. *P. officinalis*, Lungwort, is found in the woods and thickets of England, and is a native of Europe and the Caucasus. The leaves, which are the parts of the plant recommended in medicine, have no peculiar smell, but in their recent state manifest a slightly astringent and mucilaginous taste; hence they are supposed to be demulcent and pectoral. In the north of Europe it is eaten as a potherb, and, according to Ray, in his time it was brought to table in Scotland. *P. angustifolia* is a native of Europe. All the species of *Pulmonaria* are pretty plants when in blossom, and are desirable for gardens on account of their early flowering.

PULMONARIA. [Arachnida.]

PULP is a name given in vegetable physiology and botany to such parts of plants as are semifluid. This substance appears to the naked eye as a mucilaginous unorganized mass of the nature of a secretion; but it is in reality composed of very thin-sided cells which have little power of cohesion, and secrete in their interior a greater abundance of fluid than is usual. Pulp may therefore be regarded as young and imperfectly formed tissue filled with the secretions peculiar to the species. It is also in some cases, perhaps in all cases, mixed with an abundance of cinenchyma, or lactiferous tissue, which passes through it in all directions in the form of the most delicate ramifications. The pulp of the grape affords a good example of this. To the naked eye it appears to be nothing more than a fleshy homogeneous mass that may be compared to half-consolidated gum: but under the microscope it is found to be a congeries of oval transparent bags turgid with fluid and very easily ruptured; treated with iodine, they lose their transparency in some measure, and acquire a brown colour, when their limits become very distinct. The same re-agent stains still browner the vessels of the *latex*, whose course and position are thus brought clearly into view. In a few minutes however the colouring fades away in the latter, till they become as indistinct as they were before the iodine was applied: it is therefore necessary that the observation should be made as soon as the iodine has seized upon the latex or its tubes.

PULPIT. This term is derived from the Latin, the *Pulpitum*, which signifies that part of the Roman stage (distinguished from the orchestra) on which the actors recited and performed their parts. The French *Pupitre* and the English *Pulpit* both come from the same source, but are dissimilar in signification; the former meaning merely a reading-desk, and *Chaire* (*Cathedra*) being the term that corresponds with our English word. Great cost, both of material and workmanship, was frequently bestowed on pulpits in early times; and some of them rank among the most celebrated monuments of art of their period, and for a long time appear to have been treated as an architectural feature of the interior, being constructed, if not of marble, of the same material as the rest of the building. Of stone-pulpits we have few remaining in this country; but there is one in Bristol cathedral, and another in Worcester, drawings and details of which latter are given in Pugin's 'Gothic Specimens.'

Our pulpits in the present day are too often tasteless excrescences, encumbered with steps, reader's-desk, &c., and with respect to design, they are mere carpenter's and joiner's work; but

of late years many improvements have been introduced. Sometimes two pulpits are introduced, one on each side of the chancel, one for the reader and one for the preacher. In Wilton Church, in the Temple Church, London, and at other places, handsome and richly-designed pulpits have been erected.

PULSE. [HEART.]

PULTOWA. [POLTAVA.]

PULTENEY, WILLIAM, Earl of Bath, was born in 1682. His family had been anciently established in Leicestershire, and are supposed to have derived their surname from Pulteney, in that county. Young Pulteney was sent first to Westminster School, and then to Christ Church, Oxford. He afterwards travelled on the Continent, and on his return home, about 1705, was brought into Parliament for the borough of Hedon, in Yorkshire.

Pulteney attached himself to the Whig party, and took an active and distinguished part in the debates. On the accession of George I. he was appointed secretary-at-war; but when Walpole resigned in 1717 Pulteney also gave up his office. Soon after this however a coolness took place between Pulteney and Walpole, which was not removed by the appointment of Pulteney to the valuable sinecure of cofferer of the household on Walpole's resumption of office in 1720; but it was not till 1725 that Pulteney openly threw himself into the ranks of opposition, and began that course of bitter and incessant attack upon the minister which did not cease till he had driven Walpole from power in 1742. All the authority of the state seemed now to lie at the feet of Pulteney; and he actually named the new ministry, taking to himself a seat in the cabinet without any office. But the composition of the new cabinet disappointed the expectations both of partisans and of the public; and a universal storm of indignation was raised, when, after the lapse of a few months, Pulteney walked into the House of Lords as Earl of Bath. From this moment the late popular idol became quite insignificant. However he lived till 1764, chiefly occupied in nursing his private fortune, but still sometimes taking part in the debates and in public affairs. In 1760 he published 'A Letter to Two Great Men' (Mr. Pitt and the Duke of Newcastle), which excited no great attention.

PUMA. [LION.]

PUMICE-STONE, one of the varieties of lava. [LAVA.]

PUMP. [AIR-PUMP; HYDRAULICS.]

PUMPKIN is the common name of the fruit of the *Cucurbita maxima*, a plant whose native country is not certainly known, but which is probably a variety of *C. Pepo*, a species inhabiting the Levant.

PUN. A pun has been defined by Addison ('Spectator,' No. 61) to be 'a conceit arising from the use of two words that agree in the sound but differ in the sense.' Sometimes however the pun is effected by the employment of only one word, which is susceptible of a double application; as when one who had undertaken to pun upon any subject that should be given him, on being desired to make a pun on the king, answered that the king was no subject. Sometimes, though rarely, a pun has risen into a far higher region than the ludicrous; as for instance, when Burke (or whoever else it was) exclaimed, 'What is (m)ajest(y) when deprived of its externals but a jest?'

A sketch of the history of puns has been given by Addison in the paper above referred to, in which he traces the existence of the practice from the time of Aristotle downward. We may also refer to another very clever paper in the 'Guardian' (No. 36), attributed to a writer of the name of Birch, which contains what is called 'A Modest Apology for Punning.'

PUNCH, the name of the principal character in a well known puppet-show which is exhibited about the streets, and which appears to have originated in Italy. The name is a corruption of Policinella, the Neapolitan clown. But the show itself, or rather the puppets, are styled by the Italians 'Fantoccini.' Galiani, in his 'Vocabolario del Dialetto Napoletano,' gives the following account of the origin of Policinella, or rather Polecenella, as it is pronounced by the Neapolitans:—A company of strolling comedians once arrived at the town of Acerra, near Naples, in the season of the vintage, and were so amused at the buffooneries of one of the peasants, named Puccio d'Aniello, that they engaged him as one of their company. The engagement proved profitable to both parties, and the comedians had crowded houses wherever they went. After Puccio's death, his place was filled by a well-taught adept in his art, who assumed his name, softened into Polecenella, and also his manner and costume, with a mask which perpetuated the grotesque features of the facetious vintager. By degrees, personifications of the original Polecenella were multiplied all over the country, and the name and character have thus become immortal.

PUNCTUM CÆCUM, in the eye, is the part of the surface of the retina which is immediately about the spot at which the optic nerve appears to be united to that membrane. At this spot the retina has not sufficient delicacy of fibre to receive impressions from the rays of light which, coming from external objects and converging there, should form images of those objects: consequently the part contributes nothing to the perception of vision. From an experiment made by Daniel Bernoulli it is found that the part of the retina on which the rays of light produce no impression, is a circular spot whose diameter is one-seventh of the diameter of the eye, and having its centre a little way distant from the axis, or point directly opposite the centre of the pupil. This is precisely the spot from which the optic nerve appears to expand in the interior of the eye.

PUNIC WARS, the three great wars between the Carthaginians (*Pœni*) and the Romans.

I. The *First Punic War*, which lasted nearly twenty-three years (B.C. 264–241), arose out of the application of the Mamertines of Messána to Rome (B.C. 264) for aid against the Carthaginians, and Hiero, king of Syracuse. At the beginning of the war the Carthaginians were masters of the

sea, and possessed a well-furnished treasury, which enabled them to enlist a large number of mercenaries. These hired forces however were no match for the citizen-soldiers of Rome, whose native vigour more than compensated for her limited resources. In B.C. 263, Hiero was compelled to yield to the Romans, and from that time he became their faithful ally. During this war (B.C. 261), the Romans first built large ships of war. In B.C. 242, the Romans, under the consul C. Lutatius Catulus, completely defeated the Carthaginians in a sea-fight near the Ægates, a group of islands off the western point of Sicily. This battle put an end to the war. A peace was thereupon concluded on the following terms:—that the Carthaginians should evacuate Sicily and the adjacent small islands; that they should pay 3200 talents to Rome within ten years; that they should release all Roman prisoners without ransom; and that they should not make war on Hiero or his allies.

II. The causes of the *Second Punic War* are to be found in the position in which the two parties were left by the first; the Romans still dreading the power of Carthage, and the Carthaginians burning to avenge their losses. In the meantime, Rome committed an act of aggression by seizing upon the island of Sardinia (B.C. 237). At length, in the year 218 B.C., Hannibal commenced the war by taking Saguntum, a town on the eastern coast of Spain, some distance south of the Ebro, which was under Roman protection, and by crossing the Ebro, which had been fixed by a treaty (B.C. 226) as the boundary between the Roman and Carthaginian possessions. Hannibal crossed the Pyrenees into Gaul, and thence made his passage over the Alps into Italy. The details of his march into Italy, his victories at the Ticinus, the Trebia, and the Trasimene lake, his complete overthrow of the Romans at Cannæ, the indecisive progress of the war in the following years, during which Fabius Maximus and Marcellus kept Hannibal in check, and the complete turn of the scale in favour of the Romans by the destruction of Hasdrubal's army (B.C. 207), belong to history. The exploits of Scipio Africanus in Spain, his invasion of Africa, and his defeat of Hannibal at Zama (B.C. 202), are related in the article SCIPIO. The battle of Zama concluded the war. Peace was granted to the Carthaginians on the following terms: they were to retain only their territory in Africa; they were to give up all their ships, except ten triremes, and all their elephants; they were to pay the Romans 10,000 talents, at the rate of 200 a year; they were to commence no war without the consent of Rome; and to restore to Massinissa all his hereditary possessions. Thus Carthage became little more than a vassal of Rome. But this was not enough. It was deemed necessary by a powerful party at Rome that Carthage should be destroyed, and for this end, to which they were also urged by personal motives, they induced the people to engage in a third war, for which a pretext was easily found.

III. The *Third Punic War* began in the year 149 B.C., and lasted only three years. When the Carthaginians found that the Romans were resolved on their destruction, they made the most vigorous preparations for a resolute defence. The consuls Censorinus and Manilius attacked the city on opposite sides, but were repulsed. Other reverses followed. The consuls of the following year (148 B.C.) were equally unsuccessful. But in the next year (147 B.C.) Scipio Æmilianus finished the war by the capture of Carthage. [SCIPIO.] By a decree of the senate, the city was razed to the ground, and Africa was made a Roman province.

The history of the Punic wars is chiefly contained in Livy and Polybius.

PU'NICA, a genus of plants of the natural family of *Myrtaceæ*. The genus consists of only a single species, the *Pomegranate*, with a dwarf variety, which is sometimes considered a distinct species. The pomegranate has from the earliest periods formed an object of attraction in the countries from Syria to the north of India, where it grows in perfection, as well as in the north of Africa. Its dark-green foliage, its conspicuous flowers, of which the flower-cup and petals are both of a crimson colour, and its large red-coloured fruit, filled with juicy pleasant-flavoured pulp, which covers its numerous seeds, all contribute to make it an object of desire in hot countries.

PUNISHMENT. The verb *to punish* (whence the noun substantive *punishment*) is from the French *punir*, and the French *punir* is derived from the Latin *punire*, anciently *pœnire*, which is connected with *pœna* and the Greek *poinè* (ποινή). Poinè signified a pecuniary satisfaction for an offence, similar to the *wergeld* of the German codes.

The original idea of punishment was pain inflicted on or endured by a person as a satisfaction or atonement by him for some offence which he had committed. According to this conception of punishment, it appeared to be just that a person should suffer the same amount of pain which he had inflicted on others by his offence; and hence the origin of the retaliatory principle of punishment, or the *Lex Talionis*.

The infliction of pain for the purpose of exacting a satisfaction for an offence committed is *vengeance*, and punishment inflicted for this purpose is *vindictive*. But inasmuch as the proper end of punishment is to deter from the commission of offences, punishment inflicted on the vindictive principle often fails to produce the desired purpose, and moreover often involves the infliction of an unnecessary amount of pain. All punishment is an evil, though a necessary one. The pain produced by the offence is one evil; the pain produced by the punishment is an additional evil; though the latter is necessary in order to prevent the recurrence of the offence. Consequently a penal system ought to aim at economising pain, by diffusing the largest amount of salutary terror, and thereby deterring as much as possible from crimes, at the smallest expense of punishments actually inflicted.

It follows from what has been said that it is essential to a punishment to be *painful*. Accordingly, all the known punishments have involved the infliction of pain by different means

as death, mutilation of the body, flogging or beating, privation of bodily liberty by confinement of various sorts, banishment, forced labour, privation of civil rights, pecuniary fine. The punishment of death is called *capital* punishment: other punishments are sometimes known by the name of *secondary* punishments. Moreover, the pain ought to be sufficiently great to deter persons from committing the offence, and not greater than is necessary for this purpose.

A punishment ought further to be, as far as the necessary defects of police and judicial procedure will permit, *certain;* and also, as far as the differences of human nature and circumstances will permit, *equal*. If a punishment be painful, and the pain be of the proper amount, and if it be likewise tolerably equal and certain, it will be good, as punishment.

The reformation of convicts who are suffering their punishment is an object which ought to enter into a good penal system; but it is quite a distinct thing from the punishment itself, the object of which is to prevent all persons from committing crime.

An idle question is sometimes raised as to the right of a government to inflict death as a punishment for crimes, or, as it is also stated, as to the lawfulness of capital punishment. That a government has the power of inflicting capital punishment cannot be doubted; and in order to determine whether that power is rightfully exercised, it is necessary to consider whether its infliction is, on the whole, beneficial to the community. The following considerations may serve to determine this question respecting any given class of crimes. Death is unquestionably the most formidable of all punishments; the common sense of mankind and the experience of all ages and countries bear evidence to this remark. Moreover, capital punishment effectually gets rid of the convict. It may be added, as subordinate considerations, that death is the cheapest of all punishments, and that it effectually solves all the difficult practical questions which arise as to the disposal and treatment of convicted criminals. On the other hand capital punishment is likely to become unpopular; and hence, from the unwillingness of judges and juries to convict for capital offences, and of government to carry capital punishments into effect, it is uncertain. Whenever the infliction of capital punishments becomes uncertain, their efficacy ceases, and they ought to be mitigated. An uncertain punishment is not much feared. Capital punishments ought therefore to be denounced only for crimes which would not be effectually prevented by a secondary punishment, and for which they are actually inflicted with as much constancy as the necessary defects of a judicial procedure will allow.

The writings on the subject of punishment, and particularly of capital punishment are numerous. Sound opinions on the nature and end of punishment are contained in the works of Grotius and Pufendorf; but Beccaria's well-known treatise first applied an enlightened spirit of criticism to the barbarous penal system of the continental states; it cannot however be read with much profit at the present time. The best systematic work on the subject is Bentham's 'Théorie des Peines,' edited by Dumont. Some valuable remarks on the subject of punishment may likewise be found in the recent writings of Archbishop Whately and others respecting Transportation.

PUPA. In entomology this term is applied to the third stage of the existence of an insect, the egg being the first. [LARVA.]

When a caterpillar, by a series of moults, has attained its full size, it again casts its skin; but instead of keeping the caterpillar form, we find the animal much changed in appearance: it has in fact assumed the pupa state. In this pupa we can trace most of the parts of the caterpillar with an addition of other parts (in a more or less rudimentary state) which are peculiar to the perfect insect. The pupa is at first soft (and is filled with a watery fluid); but, in many instances, the skin soon becomes hardened, as in the pupa, or chrysalis, state of the Lepidopterous insects.

'From the swathed appearance of most insects in this state' (say Messrs. Kirby and Spence), 'in which they do not badly resemble in miniature a child trussed up like a mummy in swaddling clothes, according to the barbarous fashion once prevalent here, and still retained in many parts of the continent, Linnæus has called it the Pupa State, and an insect, when under this form, a Pupa. In this state most insects eat no food; are incapable of locomotion; but there are differences in the various orders which are worthy of attention. The most perfect transformation perhaps takes place in the Hymenopterous insects; that is to say, there is more difference between the larva and perfect or imago state of these insects, than in other tribes; and as one of the peculiar characteristics of the insect tribe consists in their transformation, this fact, in conjunction with others, would lead one to place that order at the head of the insect tribe.' In the orders *Hemiptera, Orthoptera,* and many of the *Neuroptera,* the pupæ are active, and differ only from the larvæ in possessing rudimentary wings. In some cases the perfect insects of these orders have no wings, and it is difficult, if not impossible, to distinguish the stages. Here there is an approach made towards the *Crustacea,* but in the true insects the skins are never shed after they have attained maturity, whereas in the Crustacea the integument is cast even after the species have the power of propagation. The necessity for moults is the same in both cases; the shell of the crab, like the integument of an insect, having no power of growth after its first formation.

PUPIE'NUS, CLODIUS PUPIENUS MAXIMUS, an officer of rank in the Roman army, was elected emperor by the senate conjointly with Balbinus, after the death of the two Gordians, in opposition to the usurper Maximinus, A.D. 240. After a reign of about a twelvemonth, he was killed, together with his colleague, in an insurrection of the Prætorians at Rome. [BALBINUS.]

PUPIL. [EYE.]

PUPIL, ARTIFICIAL. The operation of forming an artificial aperture in the iris is required in a variety of cases in which the passage of light

through the natural pupil to the deeper-seated parts of the eye is obstructed; and to meet the different exigencies of these several cases a variety of operations have been suggested, each of which in its turn deserves to be preferred. The chief of these are—1, the tearing away a portion of the iris from its attachment to the ciliary ligament, a method now very rarely employed; 2, the making an incision through some part of the iris, by the retraction of whose edges an elliptical or circular aperture is produced; 3, the making a portion of the iris protrude through an aperture in the cornea, and cutting it off. In whatever way the operation be performed, it is necessary to make the aperture in the iris as large as possible, that when it contracts in the process of cicatrisation, it may not be too small to permit the passage of a sufficient quantity of light for useful vision.

PUPIVORA. In entomology this term is applied by Latreille to his second great section of Hymenopterous insects—a section the species of which are distinguished by their having the abdomen attached to the thorax, in most cases, by a slender stalk, and not, as in the first section (*Securifera*), forming as it were a continuation of the thorax. The females are furnished with a slender bristle-like ovipositor, and in this respect they also differ from the greater portion of the Securifera.

The section *Pupivora* he divides into two minor groups, *Evaniales* and *Ichneumonides*, constituting in fact two distinct families, viz. *Evanidæ* and *Ichneumonidæ*, Leach. The British species of the former family are few, of the latter very numerous.

The larvæ of the Pupivora have no feet, and most of them are parasitical. During the summer months great numbers of Ichneumon-Flies may be seen exploring various plants in search of the caterpillars which are suited to rear their larvæ, each caterpillar having its own parasitical enemy or enemies. The female ichneumon, by means of her long bristle-like ovipositor, inserts her eggs into the body of the caterpillar in such a manner, and in such parts, that it does not destroy the life of the victim. In most cases these eggs are not hatched until the caterpillar has changed into a chrysalis; they then hatch, and the ichneumon-larvæ feed upon the contents of the pupa-case, enclose themselves in silken cocoons, and undergo their final transformations, to come forth in proper season, eating their way through the chrysalis-case. Instances are not uncommon in which the eggs of the ichneumon hatch in the body of the living caterpillar, and, what is most remarkable, they do not destroy its life. It is not until the larvæ have quitted their abode in the caterpillar that it dies, having the cocoons of the ichneumon-larvæ attached to its skin. The caterpillar so abundant on cabbages, and which is that of the common white butterfly, affords a familiar example of this nature. At certain times of the year numbers of those caterpillars may be seen on walls adjoining gardens: on these they usually attach themselves (in some sheltered situation) to undergo the transformation into the pupa state. One of these caterpillars will appear healthy, select a convenient situation, attach itself (as usual before the change into the pupa-state) by means of a silken thread around its body, but instead of undergoing the transformation, we shall find it after a short time covered with an immense number of small yellowish silken cocoons, spun by the larvæ of the ichneumons as they crawl from its body. These cocoons, which are about one-eighth of an inch in length, are attached to each other, and to the skin of the caterpillar, which then dies. The larvæ of some of the *Ichneumonidæ* themselves are infected with parasites.

For the characters of the various subdivisions of this extensive group of insects, and for descriptions of the species, the reader is referred to the 'Conspectus Generum et Familiarum Ichneumonum,' by J. L. C. Gravenhorst.

PURBACH, GEORGE, so called from the name of his birth-place, Peurbach, a village on the confines of Bavaria and Austria, and about twenty-four miles west from Linz, was born in the year 1423. Purbach became a pupil of Gmunden, who taught astronomy in the university of Vienna; he afterwards visited the principal seats of learning in Europe, in order to acquaint himself with those who cultivated astronomy; and on his return he succeeded his master Gmunden, notwithstanding very strong solicitations to fix his residence at Bologna and Padua. He constructed many astronomical instruments, among which is an application of the plumb-line to a graduated circle; and he computed several trigonometrical tables, including a table of sines for every ten minutes of the quadrant, which his pupil Müller (Regiomontanus) afterwards extended to each minute: but he is now chiefly remembered on account of the part he took in the epitomization and elucidation of the 'Almagest' of Ptolemæus.

Purbach died at Vienna, April 8, 1461, in the thirty-eighth year of his age.

PURBECK. [DORSETSHIRE.]

PURCELL, HENRY, was born in 1658, in Westminster it is supposed. His father Henry Purcell was appointed a gentleman of the chapel-royal at the Restoration. Young Henry lost his father when only six years of age, about which time he appears to have been entered as one of the children of the chapel under Cook, then master; and it is probable that he received some subsequent instruction from Dr. Blow.

Purcell was remarkable for precocity of talent. While yet a boy-chorister he composed more than one anthem; and in 1676 was chosen to succeed Dr. Christopher Gibbons as organist of Westminster Abbey. In 1682 he became one of the organists of the royal chapel, and there, as well as at the Abbey, produced the numerous anthems which spread his fame throughout the country.

Purcell's first essay in dramatic music, when only nineteen, was his setting the songs, &c. in Nahum Tate's 'Dido and Æneas,' an operetta written for a boarding-school of celebrity. The music in Nat. Lee's 'Theodosius, or the Force of Love,' performed at the Duke's Theatre, in 1690, was his first work for the stage. In the same year he set new music to 'The Tempest.' In 1691 he composed the songs, &c. in Dryden's

'King Arthur.' In 1692 appeared Sir R. Howard's and Dryden's 'Indian Queen,' with Purcell's music. His music in D'Urfey's 'Don Quixote' is remarkably appropriate and clever. He also wrote airs, overtures, and act-tunes for many dramas, among which may be mentioned Dryden's and Lee's 'Œdipus,' 'Timon of Athens,' 'The Fairy Queen,' altered from 'A Midsummer-night's Dream,' and Dryden's 'Tyrannic Love, or the Royal Martyr.'

The three detached cantatas by Purcell are undeniable proofs of his fancy, energy, and deep feeling. He also composed many single songs and duets. After his death they were collected by his widow, and published in two folio volumes, under the title of 'Orpheus Britannicus,' the second and best edition of which is now very rare.

Purcell died in November 1695, of consumption, Hawkins surmises. He was buried in the north transept of Westminster Abbey.

PURCHAS, SAMUEL, was born at Thaxted, in Essex, in 1577. He was educated at Cambridge, and was instituted in 1604 to the vicarage of Eastwood in Essex. In 1615, he was incorporated bachelor of divinity at Oxford, as he stood at Cambridge, having previously been collated to the rectory of St. Martin's, Ludgate, in London. He also became chaplain to archbishop Abbot. By the publication of his books he brought himself into debt. He died about 1628.

The works of this author are the following:—1. 'Purchas his Pilgrimage, or Relations of the World, and the Religions observed in all Ages, and Places discovered, from the Creation unto this present,' fol., 1613. The materials of this work he borrowed, as he says, of above 1300 authors. 2. 'Purchas his Pilgrimmes,' 4 vols. fol., 1625, each volume containing five books. 3. 'Microcosmus, or the History of Man,' 8vo., 1619. 4. 'The King's Tower, and triumphant Arch of London,' 8vo., 1623. 5. 'A Funeral Sermon on Psalm xxxix. 5,' 8vo., 1619. Of these the first two are best known, though they are now very scarce.

PURCHASE, which is corrupted from the Latin word Perquisitio, is defined by Littleton (i. 12) to be 'the possession of lands or tenements that a man hath by his deed or agreement, unto which possession he cometh not by title of descent from any of his ancestors, or of his cousins (consanguinei), but by his own deed.' Purchase, as thus defined, comprehends all the modes of acquiring property in land by deed or agreement, and not by descent: but it is not a complete description of purchase, as now understood, for it omits acquisition by will or testament, which however when Littleton wrote, was of comparatively small importance, as the power of devising lands did not then exist, except by the custom of particular places. Blackstone makes the following enumeration of the modes of purchase—Escheat, Occupancy, Prescription, Forfeiture, and Alienation. As to escheat, there is some difficulty in the classification, as the title appears to be partly by descent and partly by purchase; and alienation is here used in a larger sense than that which this term has in the Roman law, in which it does not comprehend acquisition by testament. Generally then, purchase is any mode of acquiring lands or tenements, except by Descent. [DESCENT.]

PURGATIVES. [CATHARTICS.]

PURGATORY ('a place of expiation,' from the Latin verb *purgare*, 'to cleanse') is the name given by Roman Catholics to an intermediate state of souls after death, and before the final judgment, during which they are supposed to expiate by certain punishments the guilt which they have incurred through life. Roman Catholics believe that the prayers of the living and other pious works may serve to shorten the term of souls in purgatory. This has given rise to the doctrine of indulgences, with which that of purgatory is closely connected. The doctrine of purgatory is said to have been first inculcated as a matter of belief by Gregory the Great, at the end of the sixth century.

PURITANS, a name first given in the reign of Queen Elizabeth to such clergymen of the church of England as declined to subscribe to its liturgy, ceremonies, and discipline, according to the requirements of the bishops in their respective dioceses. The clergymen so called desired a form of worship more simple and *pure* than they believed that of the church, as then established, to be. They were called Puritans probably out of derision, and the name was shortly applied to the laity as well as to the clergy. The reader is referred, for a general history of the Puritans, to the work of Neal, on the one hand, and, on the other hand, to the works of Strype and Collier. On the political influence exercised by the Puritans, Hallam's 'Constitutional History of England' may be consulted. [DISSENTERS; NONCONFORMISTS.]

PURL. [ARTEMISIA.]

PURPURIC ACID. This substance was first prepared and described by Dr. Prout. It is a white powder, little soluble in water, inodorous, insipid, and becomes red when heated. It is a compound of oxygen, hydrogen, carbon, and nitrogen; but chemists are not agreed as to its proportions.

The salts of purpuric acid are termed *Purpurates*. The chief among them are the purpurates of ammonia, soda, and potash. When purpurate of ammonia is added to a solution of metallic salts, the effects produced are as follows:—Cobalt, a reddish precipitate; zinc, a yellow precipitate; tin, a scarlet precipitate; mercury, protosalts, a purple precipitate; persalts, a pale rose precipitate; silver, a deep purple one. The salts of lead, iron, nickel, and copper, the chlorides of gold and platina, alter their colour by the addition of purpurate of ammonia, but are not precipitated by it.

PURSER. [NAVY.]

PURSLANE. There are two varieties of the garden purslane, the Green Purslane, and the Golden Purslane (the *Portulaca sativa* and *P. oleracea* of botanists), but these cannot be considered truly distinct species, for seeds from the same individual produce occasionally both green and golden-leaved plants.

Purslane was formerly more used than it is at present, at least in this country, in salads, as a

pot-herb, in pickles, and for garnishing. It is considered to be very cooling, and hence in warm countries it is more esteemed.

PURVEYANCE (*purveyance*, a providing), a prerogative formerly enjoyed by the King of England, of purchasing provisions and other necessaries for the use of the royal household, and of employing horses and carriages in his service in preference to all other persons, and without the consent of the owners. The persons who acted for the king in these matters were called purveyors. A privilege of the same nature was also exercised by many of the great lords. The parties whose property was thus seized were entitled to a recompense; but what they received was inadequate, and many abuses were committed under the pretext of purveyance. About forty statutes were passed upon the subject, many of them, like all the important early statutes, being a re-enactment of those preceding. Purveyance was not formally abolished till after the Restoration. By the 12 Ch. II., c. 24, this branch of the prerogative was surrendered by the king, who received in lieu of it a certain amount payable on excisable liquors.

PUS. [Abscess; Inflammation.]

PUSHKIN, ALEXANDER SERGEIVITCH, a distinguished poet of Russia, was born at St. Petersburg, May 26 (June 7th), 1799, and was educated in the Imperial Lyceum at Tzorskoe-Selo, which he quitted in 1817. On quitting the Lyceum, he began to exercise his pen with more of enthusiasm than of discretion in favour of liberalism. This occasioned his being compelled in 1820 to accept some subordinate situation under the governor-general of Odessa. Perhaps Siberia would have been the place of his destination, had not his legendary poem, 'Ruslan and Liudmila' just then appeared, and been warmly received by the public. His 'Plennik Kavkaskoi,' or 'Prisoner of the Caucasus' (1822), is a mere sketch, but it is vigorously touched. To the 'Plennik' succeeded his 'Fountain of Bakhtchisarai' (1824), a production of much superior interest to the former. His reputation was now fixed, and the public impatiently waited for other productions of his muse. But he allowed an interval of nearly three years to elapse (1824-7) between writing his 'Tzigani' (The 'Gipsies') and its being printed; and of his 'Evgenii, or Eugenius Onægin,' though the first chapter or canto appeared in 1825, the sixth was not printed till 1828.

In 1829 appeared almost the last and also the best of his narrative poems, namely, that entitled 'Poltava,' the hero of which is the same person as Byron's 'Mazeppa,' but exhibited under a very different aspect. His dramatic poem of 'Boris Godunov,' produced about this period, is one of the most interesting of all his productions. After this, Pushkin nearly abandoned poetry altogether, and applied himself to prose composition, having been not only recalled from exile, but taken into favour by the Emperor Nicholas, who appointed him historiographer, with a pension of 6000 rubles. This change in his fortunes was accompanied by a change in his opinions, which, after being on the side of liberalism, settled into the contrary extreme. On the other hand, his popularity in the literary world began to decline, and he produced no subsequent work of importance. His death, which was occasioned by a wound received in a duel, took place at St. Petersburg, Jan. 29 (Feb. 10), 1837. Besides paying his debts and bestowing a pension of several thousand rubles upon the poet's widow and family, the emperor commanded a splendid edition of all his works to be published at his own expense.

Pushkin's genius resembled that of Byron in many respects; his themes were similar, and in some cases identical; and his characters exhibit more than one coincidence.

PUTCHUK is the name by which a fragrant root is designated in the price-currents of Calcutta and Bombay, whence it is exported to Canton, being highly esteemed by the Chinese as an incense. From the places of export this would appear to be a product of India, but neither the plant which yields it nor the place where it grows has been discovered until very recently. The discovery is interesting, as the Putchuk is a substance which was known to the ancients. Dr. Royle, while in the north-western provinces of India, obtained a root which formed a considerable article of commerce, and which was said to be brought from Lahore. It was warm and aromatic in taste, fragrant, and frequently called Orris (Iris)-Root by Europeans in India. On comparing specimens of this root which he obtained in northern India with what was called Putchuk in Calcutta, he found that they were identical, and he was subsequently informed by Mr. Beckett, who had been long settled as a merchant in northern India, that what he purchased from Umritsir under the name of Kooth, he sold in Calcutta by that of Putchuk, so that there can be no doubt of the identity of the two substances; but all that has been ascertained with respect to the place where it was produced, was that it seemed to be to the north of the river Sutlege.

PUTEOLI. [Pozzuoli.]

PUTIGNANO. [Bari, Terra Di.]

PUTNEY. [Surrey.]

PUTREFACTION. [Antiseptics; Decomposition.]

PU'TSCHIUS, ELIAS, was born at Antwerp, in 1580. His chief work is an edition of the Latin writers on grammar, 'Ancient Authors of Latin Grammar,' small folio, Hanau, 1605. These authors are thirty-three in number, of whom several were never before printed, and the rest were so much corrected that they might seem, as he says in the title-page, to be then published for the first time. Three indexes are added; the first of authors, the second of Greek words, and the third, which is most copious, of things and words in general. This collection of ancient grammarians is of great value to all who are desirous of gaining a critical knowledge of the Latin language, and it also conveys indirectly many aids to the student of the Greek. Putschius died at Stade, March 9, 1606, in his 26th year.

PUTTY, the useful cement used by glaziers for fastening the glass in the frames of windows, is composed of linseed oil and whiting, well worked together by pressing and beating.

PUY. [Loire, Haute.]

PUY-DE-DOME, a department in France, formed out of a portion of Auvergne, lies between 45° 18′ and 46° 16′ N. lat., 2° 27′ and 3° 57′ E. long.; and is bounded N. by the department of Allier, E. by that of Loire, S. by those of Haute-Loire and Cantal, and W. by those of Creuse and Corrèze. Its greatest length from N.W. to S.E. is 85 miles, and the average width is about 50 miles. The area is 3078 square miles; the population in 1846 was 601,594, which gives 195.43 to the square mile, being 21.68 above the average per square mile for the whole of France.

The surface presents an extensive undulating basin inclining generally towards the north, drained by the Allier, and shut in on the east and west by two chains of volcanic mountains resting on a granitic base. This basin, which is distinguished by the name of *La-Limagne*, consists of the valley of the Allier, into which a great number of others open on either side, each furrowed by a stream that descends from the neighbouring mountains, and separated from the adjacent one by gently-sloping hills. The Limagne has a soil which consists of decomposed volcanic matter mixed with alluvial deposits; it is exceedingly fertile and well cultivated; the hill sides are covered with vineyards and orchards; the rows of walnut-trees that bound the fields, and the chestnut plantations, with their masses of foliage, add richness and variety to the landscape, which presents at every turn some new beauty. The chief products of this basin are wheat, hemp, wine, oil, and fruits; there is some fine pasture land, and a great breadth of rich meadow, especially near Riom, which is flooded every year and yields three crops of hay.

The mountains of Forez, which bound the Limagne on the east, are an offshoot of the Cévennes; they form the watershed between the Allier and the Loire, and are covered with pine forests interpersed here and there with some hungry pastures, and a few cultivated patches that yield only oats and rye.

The western boundary of the Limagne is formed by that portion of the Auvergne mountains which runs northwards out of the department of Cantal, and forms part of the watershed between the Garonne and the Loire, including the two remarkable volcanic groups of the Monts-Dôme and the Monts-Dores. The common base of these mountain groups is 1968 feet above the mean level of the Limagne. The *Monts-Dores* or *Monts-D'Or*, are in the south of the department, and consist of a great number of high peaks, the loftiest among which, called *de-Sancy*, has an elevation of 6196 feet above the level of the sea. The peak de-Sancy is covered on all sides with bare rocks, lava streams, and other volcanic products—a circumstance which favours the opinion that this elevated mass once had near it a still more elevated crater, whence the materials that form it were thrown out. Indeed but few of the peaks of the Monts-Dores have craters, yet they are all of unquestionably volcanic origin. This mountain mass is visible from Montauban, in the department of Tarn, a distance of 127 miles; and the view from the accessible summits is said to be of a most extensive range, reaching even to the Alps. On the north-western slopes of the Monts-Dores rise the two streams that give origin to the Dordogne, which river drains the south-western angle of the department. The *Monts-Dômes* group lies more to the northward, a few miles W. of the city of Clermont-Ferrand. It is famous for its picturesque beauty, and presents above forty conical peaks with extinct craters, locally called *Puys*, lava-streams that seem but just arrested in their course, basaltic columns in every variety of position, and frightful ravines, the sides of which show the agency that reared these stupendous masses. Far above all the other peaks rises the majestic cone of the Puy-de-Dôme, which gives name to the department, and forms an object of grand and striking beauty, being covered with brilliant verdure in all its vast dimensions, from base to summit, except in a few places where some rude protuberances and hideous chasms display the volcanic origin of the mountain. Although its summit is 4805 feet above the sea-level it is easily accessible, and presents in clear weather a view perhaps unequalled for extent and variety. Standing on its lofty summit the spectator beholds countless numbers of cattle and sheep feeding all round the grassy slopes of the Puy; a little further a vast number of conical peaks yawning with craters, some of which contain water; further south and west, the Auvergne ranges, extending into the departments of Corrèze and Cantal, and inclosing between them the valley of the upper Dordogne; away to eastward and northwards the whole basin of the Limagne with its towns, villages and hills, its fields of every hue, its vineyards, isolated homesteads, rivers, and highways, all spread out before him as in a map or picture. The Puy-de-Dôme is connected with the history of the barometer, Pascal's test of the Torricellian theory having been satisfied by carrying the instrument to the top of this mountain. [Barometer.] The basement and lower slopes of all these mountains abound in excellent pasture, and in medicinal and aromatic plants. Hot and cold mineral springs exist at several points, the most famous being the hot springs of Mont-Dore-les-Bains, near the source of the Dordogne. The mountains above described present the finest ancient volcanic mountain scenery in Europe; but the views among the Monts-Dores and the Monts-Dômes differ in this—that the latter in addition to other attributes of sublimity generally unite grace of outline with massive grandeur, while the former inspire the beholder with a feeling of dismay at the appearance of ruin, destruction, and naked desolation before him.

The climate of the department is not uniform. In the Limagne the summer is very hot, and the winter of short duration; the thermometer reaches 86° Fahr. in the shade in summer, and sometimes as low as 5° in winter. On the mountain slopes, above the region of vines, where only oats and

hardy grains are grown, the winter and spring are cold; the high mountains, which are adapted solely for summer pasture, have a long winter, the intense cold lasting from December to the end of February. The western range of mountains is subject to terrible hurricanes. The prevailing winds are the south-west and the north-west.

The principal rivers are the ALLIER and its feeders, the Dore and the Sioule, which drain the eastern and north-western districts respectively; the DORDOGNE; and the Ance a small feeder of the Loire which flows S., draining a small strip on the extreme south-east of the department. Highway accommodation is afforded by seven national and nine departmental roads. In the west of the department there are several small lakes, and also many beautiful waterfalls.

The corn products of the department exceed the consumption; chestnuts, hemp, apples, pears, apricots, and other fruits, are grown in great abundance. About 12,892,000 gallons of wine are made annually, of which a third part goes to the home consumption. The principal forests are in the arrondissements of Thiers and Ambert; they contain pine, oak, and beech. Horses are small. Cows are very numerous, a good deal of cheese and butter is made; and many cattle are fatted. There are immense numbers of sheep, but of inferior breed. Among the wild animals are boars, roebucks, wolves, foxes, hares, eagles, vultures, &c.

A lead mine near Pont-Gibaud and one of antimony near Rochefort are the only metallic mines worked, although the country is rich in minerals. Iron, zinc, copper, alum, and manganese, are found. Coal mines are worked in the north-west of the department near Montaigut; and also at several points on the left bank of the Allier, by which river the coals are forwarded to Paris and Orleans. Almost all the towns of the department are built of volcanic substances; and for building purposes there are numerous quarries of lava, trachytic rock, basalt, pumice, besides granite, limestone, and bitumen. The lava quarries of Volvic, near Riom, are especially to be noted.

The manufactures of the department, which are unimportant, are noticed under the several towns. The commerce is composed of the various agricultural products before named, confectionary, hides, paper, hempseed, nut-oil, deal planks, cattle, wool, coal, &c. Above 460 fairs are held chiefly for the sale of stock.

The department contains 1,970,089 acres, distributed among 223,866 proprietors, and into 2,424,522 parcels. Of this area 905,276 acres are under plough culture; 222,726 are meadow and grass land; 72,038 are under vines; 208,486 are covered with woods and forests; 474,756 acres consist of heath and mountain pasture; 14,646 acres are laid out in orchards, nurseries, and gardens; 15,756 are occupied with rivers, waters, irrigating rills, &c.; and 54,246 with roads, streets, and buildings.

The department is divided into 5 arrondissements, which with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Clermont	14	106	176,511
Ambert	8	52	92,940
Issoire	9	116	101,069
Riom	13	129	156,508
Thiers	6	37	74,571
Total	50	440	601,594

The arrondissement of Clermont takes its name from its chief town CLERMONT-FERRAND, which is also the capital of the whole department. *Billom*, formerly the capital of the Limagne, is situated on a high hill, 13 miles E.S.E. from Clermont, and has a tribunal of commerce, a college, a clerical seminary, and 3993 inhabitants, who manufacture linen, pottery, bricks, tiles, and lime; and trade largely in hemp, wool, corn, cattle, timber, &c. *Bourg-Lastic*, 28 miles W.S.W. from Clermont, near the Dordogne, has a population of 2759. *Pont-du-Château*, 9 miles E. from Clermont, and on the left bank of the Allier, which is here crossed by a basaltic bridge of 8 arches, is built on the slope and crown of a hill, and has 3562 inhabitants. It takes its name from the bridge and a castle near the river. A large portion of the articles exported from the department are sent down the Allier from this place, consisting of wine, hemp, ivory-black, coal, apples, wood, corn, hay, mill-stones, asphalte, &c. The other towns are—*Vertaison*, 9 miles E. from Clermont, population 2504.; *Veyre-Monton*, S.E. of Clermont, population 2987; and *Vic-le-Comte*, or *Vic-sur-Allier*, the birthplace of Le Sage, 12 miles S.E. from Clermont, which has 3185 inhabitants, and is celebrated for the mineral springs near it.

The arrondissement of Ambert takes its name from *Ambert*, which is situated at the foot of a ridge of hills in the fertile valley of the Dore, a feeder of the Allier, 35 miles S.E. from Clermont, and has tribunals of first instance and of commerce, a college, and 7884 inhabitants. The houses of the town are in general well built; but the streets are narrow and crooked. The granite church of St.-Jean, surmounted by its lofty spire, is the most remarkable structure. Woollen cloth, blankets, laces, garters, serge, linen, pins, tape, woollen yarn, and a large quantity of printing and engraving paper are manufactured. *St.-Amand-Roche-Savine*, 6 miles from Ambert, has silver-lead mines, and 2294 inhabitants. *St.-Anthême*, a large village 8 miles E. from Ambert, has a population of 3425. *Arlanc*, 10 miles S. from Ambert, prettily situated on the slope of a hill above the Dore, has a mineral spring; and a population of 4390, who manufacture blonde lace, linen, and small wares. *Cunlhat*, 11 miles N.W. from Ambert, has 3434 inhabitants, and manufactures of camlet, linen, and haircloth. *St.-Germain-l'Herm*, 13 miles S.W. from Ambert, has considerable manufactures of black and white lace and woollen yarn, and a population of 2270. *Olliergues*, N. by W. from Ambert, prettily situated on the Dore, has 2084 inhabitants.

In the arrondissement of Issoire, the chief town *Issoire*, the ancient *Issiodurum*, is situated near the confluence of the Couze and the Allier, 20 miles S.S.E. from Clermont, and has tribunals of first instance and commerce, a college, and 5224 inhabitants. It is in general a well built, clean, and regularly laid out town, all the principal streets abutting on a great central square in which markets are held. The parish church, which has a curiously-decorated exterior and has been numbered among the historical monuments of France, is the principal structure. Copper ware and nut-oil are the chief industrial products. The mineral springs of *Liens*, and the numerous volcanic rocks in the neighbourhood of the town, deserve mention. *Ardes*, 12 miles S.W. from Issoire, in a country bristling with volcanic rocks, stands on the Grande-Couze, and has about 2000 inhabitants. *Besse*, 16 miles W. from Issoire, built on an enormous mass of black basalt, of which substance the houses are constructed, stands on the Couze, and has 2096 inhabitants. In this town is a curious circular structure, which some think to be a temple of the sun; but Mr. Gally Knight pronounces it to be a baptistery. Two miles N.W. of Besse, is the Lake Pavin, which occupies the crater of an extinct volcano, on a high mountain peak of the Mont-Dores. *St.-Germain-Lembron*, 6 miles S. from Issoire, has a population of 2135. *Saux-Manges*, 5 miles E. of Issoire, is a small place of 2049 inhabitants, who manufacture camlet, scythes, saw-blades, reaping-hooks, and leather. *Tauves* and *La-Tour* are two towns of over 2000 inhabitants each, situated between 30 and 40 miles W. from Issoire.

Of the arrondissement of Riom, the chief town *Riom* is built on a hill above the Ambone, a feeder of the Allier, 9 miles N. from Clermont, and has 12,259 inhabitants. The town is the seat of the High Court (Cour-Royale) for the departments of Allier, Cantal, Haute-Loire, and Puy-de-Dôme; it has tribunals of first instance and of commerce, and a college. The streets are wide; the houses are constructed with lava, and have an ancient look; the courts of justice, the hospitals, and the residence of the prefect, are built in a good style. The whole town is surrounded by shady walks, one of which is adorned with a column in honour of Desaix. The chapel built by Jean de Berry, first duke of Auvergne, in 1382, for the service of the ducal palace (now the court-house), still remains entire, and contains magnificent windows of the best period of glass painting. The other structures worthy of note are the cathedral, the corn-market, and the reservoir, which is fed by an aqueduct. Linen, leather, and brandy, are the chief manufactures; these articles, together with wine, corn, hemp, fruits, nut-oil, and preserves, form the items of a considerable commerce. *Aigue-perse*, the birth-place of the chancellor De l'Hopital and the poet Delille, is a well-built little town, situated in a fertile wheat district, 9 miles N.E. from Riom, and has 3053 inhabitants. Near it, there is a mineral spring gushing out from the foot of the hill called Butte de Montpensier, the summit of which commands a magnificent view, and is covered with the ruins of an ancient castle, demolished in 1637, by order of Richelieu. The other towns are—*Combronde*, 6 miles from Riom, population 2203: *St.-Gervais*, 15 miles N.W. from Riom, population 2670: *Manzat*, 12 miles from Riom, population 1986: *Menat*, 20 miles N.W. of Riom, on the Sioule, population 2241: *Montaigut*, on a hill 30 miles N.W. from Riom, population 1652: *Pionsat*, a few miles S.W. of Montaigut, population 2320: and *Randans*, 15 miles N.E. from Riom, population 2149. Madame Adélaïde, late sister of the ex-King Louis Philippe, who was the owner of the fine estate and splendid mansion that formerly belonged to the Polignacs near Randans, was a great benefactress to this town. The mansion commands fine views over a level country, with the mountains of Forez, the Puy-de-Dôme, and the Mont-Dores in the distance.

The arrondissement of Thiers takes its name from *Thiers*, which stands on the crown and slope of a high hill, above the Durolle, 24 miles N.E. from Clermont, and has tribunals of first instance and of commerce, a consultative chamber of manufactures, a council of Prud'hommes, a college, and 9984 inhabitants. The town is very irregularly built, though some of the houses are good; and the streets are narrow, steep, and crooked. The summit of the hill presents a splendid view of the whole of the fertile district of Limagne, and of the majestic mountains of Auvergne. The vicinity abounds in wild and picturesque sites, in juxtaposition with vine-clad hills, and rich meadows. On the hill slopes, and among the rocks along the left bank of the Durolle, are numerous small habitations all resounding with the noise of the hammer or the file. The Durolle, which runs through a narrow gorge, called Trou-d'Enfer, close to the town, and forms several small cascades, drives the machinery of numerous iron forges and paper-mills. The church of St.-Jean is the most remarkable building in this town. The leading manufactures are cutlery, hardware, and paper; broadcloth, sewing thread, ribands, playing cards, chessmen, and leather, are also made. *Courpière*, 8 miles S. from Thiers, on the left bank of the Dore, has a population of 3592, and manufactures of woollens, small wares, and pottery. *Lezoux*, situated in a fertile plain, 8 miles W. by S. from Thiers, is a pretty well-built town, with 3601 inhabitants, who make pottery and tan leather. *Maringues*, situated 12 miles W. by N. from Thiers, near the confluence of the Morge with the Allier, is a well-built town, with numerous tan-yards for the manufacture of shoe and glove leather; population 4109. *St.-Remy*, 3 miles N.E. from Thiers, has 4031 inhabitants, who manufacture superior cutlery.

The department forms the see of the bishop of Clermont; is included in the jurisdiction of the High Court of Riom, and of the University-Academy of Clermont; and belongs to the 13th Military Division *, of which Clermont is head-quarters. Under the late monarchy it returned 7 members to the Chamber of Deputies; it now

* The Republican government has divided France into 17 Military Divisions, which arrangement is followed throughout the remainder of the present work.

has 13 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

PUY-LAURENS. [TARN.]

PWLLHELI. [CAERNARVONSHIRE.]

PYE, HENRY JAMES, was the son of a Berkshire gentleman. He took the degree of M.A. at Oxford in 1766. Several small volumes of poems, and a translation of Aristotle's 'Poetic,' with a commentary, were held to give him, on Thomas Warton's death in 1790, a claim to the office of poet-laureate, to the fame of which however he added nothing either before or after his appointment. He was for a good many years member of parliament for his native county, and was appointed one of the commissioners of police. He died in 1813.

PY'GATHRIX, M. Geoffroy's name for the Douc, or Cochin-China Monkey (*Lasyopyga*, Illiger). Example, *Pygathrix nemæus*, Geoffroy (*Lasyopyga nemæus*, Illiger; *Simia nemæus*, Linn.). Locality, Cochin-China.

The Douc is a genuine example of the genus *Semnopithecus*, and, from the contrast and richness of its colouring, is perhaps the most beautiful of all the monkey race. It attains to a large size, the adult males being, according to M. Rey, upwards of four feet in height. It inhabits hill-forests, and lives on fruits. Beyond this nothing is definitely known of its habits and manners. The Douc has never been brought alive to Europe. Bezoar-stones are said to be frequently found in its stomach, a proof that it is sacculated as in the other *Semnopitheci*, and also in the *Colobi*. [COLOBUS.]

PYLORI'DIANS, *Pyloridea*, M. de Blainville's name for his ninth family of *Lamellibranchiata*, which he thus characterises:—

'Body compressed, more and more cylindrical, the mantle more and more closed and prolonged backwards by two long tubes which are ordinarily distinct, with an anterior and inferior aperture for the passage of a very small and ordinarily conical foot, branchiæ narrow, free, and prolonged in the tube.

'Shell regular, rarely irregular, nearly always equivalve, gaping at the two extremities; hinge incomplete, the teeth gradually vanishing; ligament internal or external; two distinct muscular impressions, united by a pallial impression which is very-flexuous backwards.'

M. de Blainville remarks that all the animals of this family live enclosed in the mud, the sand, or calcareous stone (some very deeply), almost without ever changing their place, always in a vertical position, the mouth below and the anus above. All their shells, he observes (ordinarily white, and covered with an epidermis), hardly ever exhibit any striæ from the umbo to the base, but only lines of growth (stries d'accroissement).

He divides this family into two sections: 1, those that have the ligament (of the valves) internal; 2, those that have the ligament external and convex.

To the first family he assigns the genera *Pandora*, *Anatina*, *Mya*, *Lutricola*, *Lutraria*, &c. To the second family he assigns the genera *Psammocola*, *Soletellina*, *Sanguinolaria*, *Solecurtus*, *Solen*, *Solemya*, *Panopæa*, *Glycymeris*, *Saxicava*, *Byssomya*, *Rhomboides*, *Hiatella*, *Gastrochæna*, *Clavagella*, and *Aspergillum*. Various fossil forms belong to the *Pyloridea*.

PYLORUS. [DIGESTION; STOMACH.]

PYLOS. [MESSENIA.]

PYM, JOHN, was descended from a good family in Somersetshire, where he was born in 1584. In 1599 Pym became a gentleman-commoner of Broadgate Hall, now Pembroke College, Oxford. But he left the university without taking a degree, and went, as Wood supposes, to one of the inns of court.

Pym was early distinguished for his eloquence and knowledge of the common law. He served in several parliaments towards the end of the reign of James I., and in all those held in the reign of Charles I., as member for Tavistock in Devonshire. In 1626 he was one of the managers of the articles of impeachment against the duke of Buckingham. On Nov. 7, 1640, the first day in which the Long Parliament entered upon business, Pym made a speech respecting grievances. He classed them under three heads, namely: 1, privilege of parliament; 2, religion; 3, liberty of the subject. On Nov. 11 Pym made his celebrated speech against the Earl of Strafford, which was followed by the impeachment of that nobleman. When the articles against Laud were read, Pym made a powerful speech against him.

In 1643 the influence of Pym on the counsels of the parliament having exposed him to the chief odium of the opposite party, he published a successful vindication of his conduct.

In the November of the same year Pym was appointed lieutenant of the ordnance. He died in London, Dec. 8, 1643. He was buried in Westminster Abbey.

Pym's oratory, as far as we can judge from his published speeches, was nervous, terse, and polished. His power and popularity were so great that he received the name of 'King Pym.'

PYNAKER, ADAM, was born in 1621, at the village of Pynaker, between Schiedam and Delft. He studied at Rome, and returned to his own country with the reputation of an excellent painter. He in general preferred a strong morning light, which allowed him to give his trees a more lively verdure. He is much esteemed for the skill with which, by a judicious disposition of the ground, interrupted by breaks, and diversified by hills and valleys, he gives the effect of distance gradually receding from the view as far as the eye can reach. His larger pictures are by no means equal to his smaller ones, which are highly esteemed. They are very scarce, in this country at least. Pynaker died in 1678, at the age of 52.

PYRAMID (πυραμίς), a solid figure contained by a polygonal base, and the triangles formed on the sides of the base by lines drawn from one point to the angles of the base. It is among plane solids what the cone is among curvilinear ones.

PYRAMIDS. The pyramids of Egypt, especially the two largest of the pyramids of Jizeh, are the most stupendous masses of building in

stone that human labour has ever been known to accomplish. The Egyptian pyramids, of which, large and small, and in different states of preservation, the number is very considerable, are all situated on the west side of the Nile, and they extend, in an irregular line and in groups at some distance from each other, from the neighbourhood of Jizeh, in 30° N. lat. as far south as 29° N. lat., a length of betwen 60 and 70 miles. All the pyramids have square bases, and their sides face the cardinal points.

The pyramids of Jizeh are nearly opposite to Cairo. They stand on a plateau or terrace of limestone, which is a projection from the Libyan mountain-chain. The surface of the terrace is barren and irregular, and is covered with sand and small fragments of rock: its height, measured from the base of the great pyramid, is 164 feet above the Nile in its low state, taken at an average of the years 1798 to 1801. The north-east angle of the great pyramid is 1700 yards from the canal which runs between the terrace and the Nile, and about five miles from the Nile itself.

Herodotus was informed by the priests of Memphis that the great pyramid was built by Cheops, king of Egypt, about 900 B.C., or about 450 years before Herodotus visited Egypt. He says that 100,000 men were employed twenty years in building it, and that the body of Cheops was placed in a room beneath the bottom of the pyramid, surrounded by a vault to which the waters of the Nile were conveyed through a subterranean tunnel. A chamber under the centre of the pyramid has indeed been discovered; but it does not appear to be the tomb of Cheops. It is about 56 feet above the low-water level of the Nile. The second pyramid was built, Herodotus says, by Cephren, or Cephrenes, the brother and successor of Cheops; and the third by Mycerinus, the son of Cheops.

The pyramid of Cheops consists of a series of platforms, each of which is smaller than the one on which it rests, and consequently presents the appearance of steps, which diminish in length from the bottom to the top. Of these steps there are 203, and the height of them decreases, but not regularly, from the bottom to the top, the greatest height being nearly four feet and two-thirds (4.628), and the least rather more than one foot and two-thirds (1.686). The horizontal lines of the platforms are perfectly straight, and the stones are cut and fitted to each other with the greatest nicety, and joined by a cement of lime with little or no sand in it. It has been ascertained that a bed eight inches deep has been cut in the rock to receive the lowest external course of stones. The vertical height, measured from this base in the rock to the top of the highest platform now remaining, is 456 feet. This platform has an area of about 1067 square feet, each side being 32 feet 8 inches. If to this were added what is necessary to complete the apex of the pyramid, the total height would be about 479 feet. Each side of the base, measured round the stones let into the rock, is rather more than 763 feet (763.4) and the perimeter of the base is therefore 3053.6 feet. The area of the base, measured along the outside

of the stones let into the rock, is 64,753 square yards, or about 13⅓ acres. This area is about the same as Lincoln's Inn Fields, London, measured by the wall of Lincoln's Inn Garden and the sides of the houses within the court-yards. The surface of each face, not including the base let into the rock, is 25,493 square yards; and that of the four faces is consequently 101,972 square yards, or more than 21 acres. The solid content of the pyramid is about 3,394,307 cubic yards, which (not making any deductions for chambers and passages in it) has been estimated to be six times the mass of stone in the Plymouth breakwater. Reckoning the total height at 479 feet, the pyramid would be 15 feet higher than St. Peter's at Rome, and 119 higher than St. Paul's, London.

The entrance to the great pyramid is on the north face, about 47½ feet above the base, and on the level of the 15th step from the foundation. The passage to which the opening leads is 3 feet 7½ inches square, with a downward inclination of about 26°. This passage leads to another, which has an ascending inclination of 27°. The descending passage is 73 feet long to the place where it meets the ascending passage, 109 feet long, at the top of which there is a platform, with the opening of a well or shaft, which goes down into the body of the pyramid, and the commencement of a horizontal gallery 127 feet long, which leads to the queen's chamber, 17 feet long, 14 wide, and 12 high. Another passage or gallery 132 feet long, 26½ high, and nearly 7 wide, commences at the platform, and is continued in the same line as the former ascending passage, till it reaches a landing, from which a short passage leads to a small chamber or vestibule, whence another leads to the king's chamber, which is lined with large blocks of granite well worked. The king's chamber is 34⅓ feet long, 17 wide, and 19¼ high. The roof is formed of nine slabs of granite reaching from side to side: the slabs are therefore more than 17 feet long by 3 feet 9½ inches wide. This chamber contains a sarcophagus of red granite; the cover is gone, having probably been broken and carried away. The sarcophagus is 7 feet 6½ inches long, 3 feet 3 inches wide, and 3 feet 8½ inches high on the outside, the bottom being 7½ inches thick. There are no hieroglyphics upon it.

Mr. Davison, in 1763, discovered a chamber, immediately over the king's chamber, and Colonel Vyse, in 1836-7, discovered three other chambers, also above the king's chamber. But none of them are much more than 3 feet high. They have probably been formed merely to lessen the weight of the mass above the king's chamber.

Captain Caviglia, in 1816, discovered that the entrance passage did not terminate at the bottom of the ascending passage, but was continued downwards in the same inclined plane 200 feet farther, and by a short horizontal passage opened on what appeared to be the bottom of the well. The passage however continued in the same direction 23 feet farther, then became narrower, and was continued horizontally 28 feet more, when it opened in a large chamber cut in the rock, and

under the centre of the pyramid. This chamber is about 26 feet by 27. Another passage 55 feet long leads from this chamber, but it appears to terminate abruptly.

The well, which appeared to Mr Davison and Captain Caviglia to descend no lower than where it was intersected by the descending passage, its depth there being 155 feet, was afterwards cleared out by the French to the depth of 207.75 feet, of which about 145 feet are in the solid rock; so that the base of the pyramid being 164 feet above the low-water level of the Nile, the present bottom of the well is 18 feet 6 inches above the Nile; but the actual bottom does not appear to have been yet reached. The temperature within the body of the pyramid was found to be 81° 5′ Fahr., and in the well it was still higher.

The materials of all the pyramids are limestone, and Belzoni is of opinion that part of the stone for the second pyramid was procured immediately on the spot, judging from the manner in which the rock has been cut away round the pyramid. Herodotus certainly understood that all the stone was brought from the mountains near Cairo, where there are indeed ancient quarries of great extent; but it seems probable that the greatest part of the materials came from the west side of the Nile. The blocks of granite were of course brought from Syene, which is nearly 500 miles higher up the Nile. The rock on which the great pyramid stands has been found to project at least as high as 80 feet into the body of it. The stones of which it is built rarely exceed 9 feet in length and 6½ in breadth; the thickness has been already stated.

The ascent of the great pyramid, though not without difficulty and danger, from the broken state of the steps, is frequently accomplished, and even by females.

The pyramid of Cephren, the second in size, has the following dimensions, according to Belzoni:—

	Feet
Side of the base	684
Vertical height	456
Perpendicular bisecting the face of the pyramid	568
Coating from the top to the place where it ends	140

The angle which measures the inclination of each face to the base is 52.5°, and consequently this pyramid has a steeper ascent than the first. This second pyramid does not rise from the natural level of the plateau, but out of an excavation or deep cut made in the solid rock all round the pyramid. The rock in which this excavation has been made is higher than that on which the great pyramid stands, so that both pyramids may stand on the same level, but this does not seem to have been accurately ascertained.

Belzoni, after great exertion, succeeded in opening the second pyramid, and after traversing passages similar to those in the great pyramid, reached the main chamber, which is cut out of the solid rock. It is 46 feet 8 inches long, 16 feet 3 inches wide, and 23 feet 6 inches high. The covering is made of blocks of limestone, which meet in an angular point, and form a roof of the same slope as the pyramid. The chamber contained a sarcophagus, formed of the finest granite, which is 8 feet long, 3 feet 6 inches wide, and 2 feet 3 inches deep in the inside. There were no hieroglyphics on it. Some bones were found in it, which were ascertained to be those of an ox. From an Arabic inscription on the wall of the chamber, it appears that some of the Arab rulers of Egypt had entered this pyramid and closed it again. Belzoni also discovered another chamber in this pyramid.

The ascent of the upper part of the second pyramid is extremely difficult and dangerous. The upper part still retains the casing stones which originally filled up the intervals between each platform, but which have been removed entirely from the great pyramid, thus leaving what appear now as a series of steps from the bottom to the top.

The pyramid of Mycerinus, the third of the Jizeh group, is about 174 feet high; the side of the base is 330 feet, and the angle made by the plane of the face with the plane of the base is about 45°. Belzoni says that he found on the north side a considerable number of blocks of granite, which had evidently formed the coating: 'Proceeding yet lower as I cleared away the rubbish, I found that part of the coating still remained in its place down to the base.' This pyramid has not been opened.

There are some large pyramids at Sakkârah. One of them is about the size of the pyramid of Cephren. Each side of the base is 656 feet, the height is 339 feet, and it has 154 steps. At Dashour there are also some large pyramids. One of them has a base, each side of which is 700 feet, a perpendicular height of 343 feet, and 154 steps. At Thebes there are some small pyramids of sun-dried brick, in which the central chambers have vaulted roofs. There are numerous pyramids in Nubia, perhaps eighty or more, but they are generally small. Next to those of Egypt the most extraordinary pyramids now existing are those of Mexico. [CHOLULA; MEXICO.]

PYREN, a crystalline substance procured from gas-tar. It is insoluble in water, but crystallises in small rhombic laminæ in alcohol. It is insipid and inodorous, slightly soluble in alcohol and in æther. It melts at about 350° Fahrenheit, and concretes on cooling into a crystalline mass. A stronger heat volatilises it without alteration.

PYRÉNÉES, the *Pyrenæi Montes* of Julius Cæsar, and the *Puréné* of Strabo, a range of mountains extending from the Mediterranean Sea to the Bay of Biscay, and constituting a natural barrier between France and Spain. The etymology of the name is uncertain. The Pyrenees are connected on the north-east with the Cévennes [CE'VENNES]; and on the west, their prolongation forms the mountains of Guipuzcoa, Biscay, Asturias, and Gallicia, which terminate in Capes Ortegal and Finisterre, and the other headlands of the north-west of Spain. The present article is a notice of that part only of the system to which the name Pyrenees is usually applied.

The area occupied by these mountains is com-

prehended between 42° 10′ and 43° 20′ N. lat., and between 3° 20′ E. and 2° 0′ W. long. The length of the chain from Cape Creux, near the town of Rosas, in Cataluña, to the port of Passages in Guipuzcoa, is about 270 miles in a straight line. The breadth varies from 20 to 60 miles: it is greater near the central part of the chain than toward the extremities. The Pyrenees pass along the border of the following departments of France, enumerated in order from east to west: Pyrénées-Orientales, Ariège, Haute-Garonne, Hautes-Pyrénées, and Basses-Pyrénées. In Spain the Pyrenees pass through Cataluña, the valleys of Andorre and Arran, Aragon, and Navarre.

The range of the Pyrenees may be regarded as consisting of two parts, both having the same general direction, but not forming one continuous line: the point of dislocation is near the source of the Garonne, where the main ridge recedes southwards, so as to inclose the head of the Val d'Arran, and then, having advanced a little way along the western side of the valley to the northward, it again resumes its original direction of east and west. From the Garonne to the Mediterranean the principal ridge is more advanced toward the north than between the source of the Garonne and the Bay of Biscay. The southern slope is much steeper, and the ascent invariably more difficult than the northern. It is worthy of remark, that the loftiest summits are not found in the direction of the main ridge, but at short distances from it, in some of the numerous spurs thrown out on both sides.

At their eastern extremity in Cape Cerbère the Pyrenees are about 1470 feet high above the sea; they rise rapidly as they proceed westwards, reaching 1920 feet near Bellegarde; after a slight depression here, which forms the pass of Pertus, they swell to the lofty mass of Costabona, whence springs to northward the spur crowned by the Canigou, 9135 feet high. The principal ridge attains the height of several thousand feet not far from Mont-Louis, and, instead of the rounded summit terminating in plateaus covered with forests or pastures, it begins to assume bolder and more imposing forms; a crest bristling with peaked summits and scarped rocks, frowning chasms, and precipices, become the leading features. Sinking to 5113 feet to form the pass of La-Perche, it soon rises to 6394 feet, and increases to 7673 feet near the valley of Vic-Dessos; here it again swells to above 9000 feet, and sends out northwards the spur that contains Montcalm, whose summit is 10,513 feet high. From this part to the source of the Garonne in the Val d'Arran the height is almost uniformly about 7673 feet. After bending round the Val d'Arran, another massive swell takes place in the main ridge, whence projects to the southward the gigantic spur containing the Maladetta, which reaches the height of 10,863 feet, and is one of several peaks that are gathered nearly in a semicircle round the Peak of Néthou, or Malahite, the loftiest summit in the Pyrenees, which has an elevation of 11,168 feet above the sea. Between the Maladetta and the Val d'Ossau, the principal chain reaches its greatest height, the crest maintaining an elevation of 8,320 feet, while the spurs thrown out north and south contain several very lofty peaks, among which are —the Punta-de-Lardana, 11,000 feet; the Tours-de-Marboré, the highest of which has an elevation of 10,660 feet; Mont-Perdu, 10,991 feet; the Vignemale, 10,817 feet; the Pic-du-Midi, 9436 feet. In this part also are numerous lakes, glaciers, cascades, and, inclosed between the lateral ranges, transverse valleys of great length abounding in magnificent scenery. [Pyre'ne'es, Hautes.] West of the Val d'Ossau the summit of the main ridge, as well as of the branches, again assumes the generally rounded form, and in many places is covered with pastures; here and there however are still seen peaks exceeding 7500 feet in height. The range at its western, as at its eastern extremity, is crossed by several practicable passes, called *ports* or *cols*, the most important of which are noticed in the account of the French departments named above. The Pyrenees, as considered in this article, terminate near Fuenterabia, in the masses which inclose the valley of the Bidassoa, while the main ridge continues its western course under various names across the north of Spain.

The lateral branches of the Pyrenees, as of all great mountain masses, are thrown off at the points where the main ridge rises into lofty summits; while the heads of the valleys are marked by depressions, which constitute the natural passes from one side of the mountains to the other. All the great valleys of the Pyrenees are transverse. The vale-head is usually at a port, and the valley extends for many miles towards the north or south bounded by the lateral branches of the mountains. Many of the vale-heads are of a nearly circular form; the one most famous for its romantic scenery is the cirque of Gavarnie in Hautes-Pyrénées. [Pyre'ne'es, Hautes.] Many of the valleys present a succession of basins, locally called *oules*, or pots, through which the stream that waters the valley winds slowly, assuming a character in keeping with the quiet scenery of these secluded spots. In the upper part of the valleys, where these basins are more frequent and more perfect in their form, they often contain lakes. Lakes are numerous on the French side of the mountains, some of them in very elevated sites; on the Spanish side there are very few lakes.

The line of perpetual congelation on the Pyrenees appears to vary, rising considerably higher on the northern than on the southern slope, but it may be stated to be about 9000 feet above the sea. The climate also of the Pyrenees varies considerably. It is warmer at the extremities, because of the inferior height of the mountains and the proximity of the sea. Here the winters are short, and in the lower valleys snow rarely lies more than a day or two. In the upper valleys the climate is more rigorous. The pine and the fir, the box, the rhododendron, the Alpine rose, and a variety of other trees and shrubs, grow on the sides. The summers in all the valleys are very warm, and vegetation is luxuriant. Thunder-storms are frequent.

Numerous streams rise both on the northern and the southern side of the Pyrenees. Those on the southern side, except a few near the eastern extremity, flow into the EBRO. The waters of the northern slope are carried into the Bay of Biscay by the Adour, the Garonne, the Ariège, and their numerous feeders; towards the eastern extremity the Aude, the Tech, the Tet, and the Gly, are tributaries of the Mediterranean. There are numerous mineral springs in the neighbourhood of the Pyrenees. Those of Bagnères-de-Bigorre, Bagnères-de-Luchon, Barrèges, St.-Sauveur, in the valley of Lavedan; Cauteretz; Eaux-Bonnes, in the val d' Ossau; Eaux-Chaudes, in an adjacent valley; Ax, in the valley of the Ariège; Alet, in that of the Aude; and some others, are of considerable note.

In the higher Pyrenees glaciers, traversed by deep chasms, are found only between the valleys of Arran and Ossau, and for the most part on the northern slope of the mountains. Avalanches occur in the high mountains as in the Alps.

The recesses of the Pyrenees are the haunts of the izard, a variety of the chamois, of smaller size and brighter colour. The bear and the wolf are also found. The slopes of the mountains afford pasturage in summer to numerous flocks, which are driven thither from the plains or lower slopes where they pass the winter. Medicinal plants abound. Iron, copper, and lead mines are worked, and fine statuary and other marble, including some of the most beautiful varieties, is quarried. Among the mountaineers the goître is a common disease.

PYRÉNÉES, BASSES, a department in France, formed out of the principality of Béarn, Basse-Navarre, of the Basque districts of Soule and Labour, and a portion of Chalosse, lies between 42° 47′ and 43° 35′ N. lat., 0° 2′ E. and 1° 45′ W. long., and is bounded N. by the departments of Landes and Gers, E. by that of Hautes-Pyrénées, S. by the Pyrenees and Spain, and W. by the Bay of Biscay. Its greatest length from E. to W. is 88 miles; the breadth varies from 55 to 13 miles. The area is 2894 square miles; and the population in 1846 was 457,832, which gives 158.2 to the square mile, being 15.55 below the average per square mile for the whole of France.

The department takes its name from its position on the slopes and at the foot of the Western Pyrenees, which send out numerous offshoots to the north-west, dividing the surface of the department into a great number of valleys, each watered by a clear rapid stream that ultimately falls into the ADOUR on the northern boundary. From the Basque word for running water these mountain rivers are called *gaves*. The principal of them are the Gave-de-Pau, which drains the north-east, and the Gave-d'Oloron (formed by the gaves that drain the valleys of Aspe and Ossau), which runs through the central districts. More to westward are the Bidouze and the Nive (this enters the Adour at Bayonne), the Nivelle, which rises in Spain and enters the Gulf of Gascogne at St.-Jean-de-Luz, and the Bidassoa, which marks the boundary between France and Spain for a short distance before its entrance into the Bay of Biscay below Fuenterabia. Timber and other articles are floated down all these rivers almost from their sources, such of them as fall directly into the sea have a tide navigation a few miles from their mouths.

The lower valleys of the department, the principal of which are those of Baigorry, Soule, Aspe, and Ossau, are fertile. The vale-heads in many instances have the form of an amphitheatre (locally called *oule* from the Spanish *olla*, pot), inclosed by high mountains, and connected with the valleys by narrow gorges; some of them also present beautiful cascades. The high valleys and lower slopes of the Pyrenees afford excellent pasture, on which great numbers of cattle, swine, sheep, mules, and light Navarrese horses are fed. The hill-sides are in general covered with vineyards, which yield very good wine, and with plantations of fruit and chestnut-trees. The annual produce of wine is about 7,150,000 gallons, the best kinds being those of Jurançon and Gan. The high mountains are to a great extent covered with forests of pine, fir, and oak, which afford good ship timber. Along the Adour there is some marsh land, and in the north-west, and near the sea, there are some naked barren wastes. Of wheat the produce is not enough for the consumption; other crops are rye, barley, oats, millet, chestnuts, and maize, which last forms the principal article of food of the peasantry. The growing of flax and hemp, the trade in hams with Pau and Bayonne, and the traffic in mules and cattle with Spain, are the most important sources of wealth to the agriculturist. Silver, copper, iron, lead, coal, salt, cobalt, and sulphur, are found. Slate, marble of all colours, granite, alabaster, rottenstone, and marl, are quarried. Of the numerous mineral springs the most famous are those of Eaux-Bonnes and Eaux-Chaudes, in the upper part of the val d'Ossau. Game abounds in the highlands, and includes roebucks, bears, chamois, ortolans, &c.

The height of the Pyrenees, and the snow that lies on them several months in the year, the proximity of the ocean, and the great number of springs, streams, marshes, and rivers, which, presenting a considerable surface, absorb a large quantity of heat, modify the temperature of the department very considerably, and render it much less genial and more cold than one would expect from the latitude. From the end of February to the end of April the south wind blows regularly, changing winter into spring; west winds succeed for the next two months; and during the summer and autumn the north and north-west winds prevail. In some districts men and women, the latter especially, are very subject to goître, the diseased gland in some exceeding the size of the head.

The manufactures include linen, calico, coloured handkerchiefs, flannel, drugget, capes, hosiery, Bearnese caps, carpets, chocolate, liqueur and common brandy, paper, leather, pottery, and some iron. Ships are built on the Adour and on the coast. The commerce is composed of the various products already named, and of wine, liquorice, rosin, prepared skins, wool, hides, deal planks, colonial produce, salt, &c. Highway accommodation is afforded by 5 national and 20

departmental roads: two of the former lead across the Pyrenees from Bayonne to Spain, one through St.-Jean-Pied-de-Port by the *ports* or passes of Orisson and Roncevaux; the other to Pamplona by the pass of Maya.

The department was comprised in the Roman *Novempopulana*. It is inhabited chiefly by two distinct races, the Bearnese and the Basques, who differ from each other in character and language. There are also several of that once degraded race, the Cagots, who are now believed to be descended from the Saracens.

The surface measures 1,852,099 acres, distributed among 88,786 proprietors and into 893,397 parcels. Of this area, 386,049 acres are under tillage; 163,723 are natural pasture; 57,269 are laid out in vineyards; 323,183 are covered with woods and forests; 15,385 are occupied with orchards, nurseries, and gardens; 841,997 consist of bleak mountain and barren moor; 37,106 acres are covered with streets, roads, and buildings; and 24,820 with rivers, waters, and lakes.

The department is divided into 5 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Pau . . .	11	220	128,136
Oloron . .	8	81	77,668
Orthez . .	7	157	85,929
Bayonne .	8	54	89,912
Mauléon .	6	147	76,187
Total . .	40	659	457,832

Of the arrondissement of Pau, and of the whole department, the capital is PAU. *Lescar*, 3 miles N.W. from Pau, is built on the slope of a hill on the right bank of the Gave-de-Pau, and has a population of 2096; before the revolution of 1789, it was the residence of a bishop, and had a college of Barnabites. The church of Lescar is reckoned among the historical monuments of France. *Morlaas*, once the capital of Béarn, and the residence of its viscounts, is situated 5 miles N.E. from Pau, and has 1836 inhabitants. For several centuries there was a mint in this town, at which the *livres morlanes* were coined. Horse-races were established here by Gaston IV. *Nay*, situated on the Gave-de-Pau at the extremity of a fertile plain 10 miles S. by E. from Pau, is a well-built town with 3227 inhabitants, who manufacture woollen cloths, drugget, blankets, calico, hosiery, caps, and leather. *Pontac*, 15 miles S.E. from Pau, on the Lousse, a feeder of the Gave-de-Pau, has a population of 2123.

In the arrondissement of Oloron, the chief town *Oleron* or *Oloron*, situated on the summit and slope of a hill at the confluence of the Aspe and the Ossau, which here unite to form the Gave-d'Oloron, is an ancient town, with 6804 inhabitants. The town, which occupies the site of the ancient *Iluro* or *Elorensium Civitas*, has a tribunal of first instance, manufactures of cloth, woollen caps, hosiery, woollen yarn, horn and boxwood combs, leather, and paper. There is a good trade with Navarre and Aragon in wool, sheep-skins, hams, and cattle. A high bridge over the Aspe, under which there are several mills, joins the town to *Sainte-Marie-d'Oloron*, a well-built little town of 3629 inhabitants. In this town, there is a street called Rue des Cagots from its having been the residence of that unfortunate race; in the ancient parish church there is still to be seen the separate door and holy water basin of the Cagots. *Arudy*, prettily situated in a fertile territory watered by the Ossau, is 10 miles S. from Oloron, and has about 2000 inhabitants, several of whom are Cagots. The church of Arudy like that of Sainte-Marie, gives evidence of the loathing with which this race was formerly looked upon. Arudy is a place of considerable trade in wool, cattle, sheep, corn and agricultural produce, as the shepherds and graziers on the slopes of the Pyrenees dispose of their stock and buy provisions in the town. *Laruns*, a small place of 1814 inhabitants, 8 miles S. from Arudy, is a depôt for the mast and ship timber from the Pyrenees for the French marine. It has also iron forges. Not far from this town is the valley, village, and baths of Eaux-Chaudes. *Lasseube*, a large village with a population of 3040, stands on the Buze, 8 miles N.E. from Oloron. *Monein*, a well-built town, consisting of several good streets abutting on a central square, is situated 8 miles N. from Oloron, on the left bank of the Baise, in a country productive of excellent wine, and has 5373 inhabitants. There are iron, copper, and lead mines in the neighbourhood. The chief trade is in wine and ship timber.

The arrondissement of Orthez takes its name from its chief town ORTHEZ. *Salies*, 8 miles W. from Orthez, takes its name from its abundant salt springs; it stands on a small feeder of the Gave-d'Oloron, and has a considerable trade in salt and hams. The population of Salies is 7852.

In the arrondissement of Bayonne the chief town is BAYONNE. *La-Bastide-de-Clairence*, 14 miles E. from Bayonne, has 2097 inhabitants, who manufacture hosiery, caps, and leather. There are copper and iron mines near it. *Bidache*, 19 miles E. from Bayonne, on the Bidouze, which is here navigable, is a pretty town with 2869 inhabitants. *Hasparren*, 11 miles S.E. from Bayonne, situated in a fertile and well cultivated country, has 5370 inhabitants, and a great number of tanneries for shoe and white leather, and a large trade in cattle. *St.-Jean-de-Luz*, a small seaport at the mouth and on the right bank of the Nivelle, over which a bridge leads to the suburb of *Sibourre*, has a population of 3208. The town is pretty well built, and is defended by two forts, near one of which there is a lighthouse. *Ustaritz*, 7 miles S. from Bayonne, is a collection of hamlets on the left bank of the Nive, and has a population of 2348. Before the revolution of 1789 it was the seat of a court of justice for the territory of Labour. The administrative council of Labour, called *bilcar*, and consisting of the heads of families, met in a rocky wood near Ustaritz for the decision of questions affecting all the communes of the territory. Except the pre-

sident and secretary, who sat on stones by a large block which served for a table, the members of the bilcar stood leaning on their blackthorn sticks, or against the old oaks that grew in a circle round the place. The privilege of managing their own affairs was taken away from this people by the revolution of 1789.

The arrondissement of Mauléon takes its name from *Mauléon*, a small town, with a college and 1167 inhabitants, situated on the Gave-de-Gaison, which divides it into two parts—one built on a hill surmounted by an ancient castle, and the other in a level plain. Mauléon was the capital of the district of Soule. The tribunal of first instance is at *St.-Palais*, a little walled town with 1619 inhabitants, situated in a fertile country, on the left bank of the Bidouze. *St.-Etienne-de-Baigorry* is noticed under BAIGORRY. *St.-Jean-Pied-de-Port*, a small fortified town, with a population of 2332, is situated on the Nive, 18 miles W. by S. from Mauléon; it takes the latter part of its name from its position at the foot of the *port* or passage across the Pyrenees into Spain. The town is of some importance in a military point of view; the citadel stands on a hill, and commands three passes by which France may here be entered from Spain. Not far from this town, is Roncevaux, famous for the defeat of Charlemagne in 778, and for the death of Roland: in the Augustinian abbey of Roncevaille, as the place is properly called, the monks display some memorials of the illustrious paladin, whose memory is still glorious in the neighbourhood.

The department forms the see of the bishop of Bayonne; it is included in the jurisdiction of the High Court and University-Academy of Pau; and belongs to the 11th Military Division, of which Bayonne is head-quarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 10 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

PYRÉNÉES, HAUTES, a department in France formed out of the districts of Bigorre and Quatre-Vallées, and a portion of Nébouzan, lies between 42° 39′ and 43° 34′ N. lat., 0° 30′ E. and 0° 20′ W. long., and is bounded N. by the department of Gers, E. by Haute-Garonne, S. by Spain, and W. by Basses-Pyrénées. Its greatest length is about 70 miles, and its greatest breadth about 45. The area is 1748.3 square miles, and the population in 1846 was 251,285; which gives 143.73 to the square mile, being 30.02 below the average per square mile for all France.

The department takes its name from the Pyrenees, which attain their greatest height on the southern boundary, where Monte-Maladetta, Mont-Perdu, and the highest peak of the Vignemale group, reach respectively 10,863, 10,991, and 10,817 feet above the sea level. Stretching northwards from this great mountain barrier, the department presents a surface diversified by plains, hills, forests, valleys, gorges, high mountains, torrents, and waterfalls. Two lateral offsets of the Pyrenees extend northwards and terminate in the two ranges of hills that inclose between them the fine plain of Bigorre. Between this plain and the main range of the Pyrenees occur a great number of picturesque valleys, where the scenery comprises within little compass the quiet well-sheltered village, the snow-clad mountain, with rocky precipitous sides, or with slopes shaded by dark forests, and the whole echoing with the noise of waterfalls, or animated by the cheerful babble of the furiously-running *gave*. Among the most noted of these valleys is that of Cauteretz, celebrated for its hot springs. In most instances, the valleys, which in their higher parts contract at intervals to mere gorges wide enough to afford a passage for the troubled waters of the *gave*, terminate in vale-heads that take the form of an amphitheatre. Of these vale-heads that called the *Cirque de Gavarnie* must be specified. The road or path to this vale-head from the village of Gèdres passes some savage mountain scenery, and among a chaos of massive blocks of stone, many of them large enough to afford singly sufficient material for building a cathedral. On reaching the vale-head one sees a vast semicircle of precipitous rocks, about 1640 feet high, broken into three stages or steps, on one of which a glacier rests, forming part of the ice-field of the Mont-Perdu group. From a lake among the glaciers on this lofty mountain, the Gave-de-Gavarnie, the head water of the Gave-de-Pau leaps down the savage side of the Cirque 328 feet at a single bound, and, striking against one of the steps or ledges above mentioned is dashed into spray, which, struck by the rays of the sun, forms an infinite number of rainbows, some of a completely circular form. The broken waters from this point form seven cascades (these again divide into a greater number on striking the next ledge), and at length, uniting at the bottom, after a total fall of above 1600 feet, roar in a torrent stream through a hollow vault worn out under the rock-strewn floor of the Cirque of Gavarnie. Excursions are made over rocks, snow, and glaciers, from Gavarnie to the Tours-du-Marboré, and to the pass called *Brèche-de-Roland*, a colossal gap in the mountain-wall 330 feet wide, and nearly 9000 feet above the sea, which Roland, of the famous sword, is fabled to have made for his followers, and which is now frequented only by smugglers and adventurous tourists. There are many more practicable passes however than the Brèche-de-Roland, at a height of 6,000 to 7,000 feet, but all of them are subject to tremendous hurricanes, and such is the danger in threading them, that it is a received axiom that among these stormy heights 'the son must not wait for the father, nor the father for the son.'

The *Pic-du-Midi-de-Bigorre*, which stands in front of the main mass of the Pyrenees, at the south of the plain of Bigorre, rises to the height of 9436 feet above the sea-level. It is ascended not without difficulty by the valley of Barèges and the gorge of Grip. In clear weather the view from its summit is truly magnificent: to the southward the Pyrenean range extends in a vast crescent mass, surmounted at different distances by tremendous peaked or rounded heights, whose slopes are covered with snow heaps or with ice-fields that contrast strongly with the sombre hue of the dark

brown rocks near them. To the northward, all inequalities of surface seem annihilated, and a vast plain spreads itself out before the eye, comprising the departments of Basses-Pyrénées, Gers, and Haute-Garonne.

The hilly region which extends over a great portion of the department N. of the Pic-du-Midi-de-Bigorre, is furrowed by numerous streams flowing though lateral valleys of great beauty, and emptying themselves into the Adour or the Garonne. The fine plain of *Bigorre*, in the centre of which stands the town of Tarbes, inclines gradually towards the north. The ranges that inclose it on the E. and W. are covered with woods throughout their whole length; the Adour and its feeders drain it; good high roads, diverging from Tarbes, and several other branch roads, traverse its surface, which is strewed with towns, villages, and hamlets in all directions.

The principal rivers are the ADOUR, which runs through the department from S. to N.; the GARONNE and its feeder the Neste, which drain the south-eastern districts; the Gave de-Pau, which flows through the beautiful valleys of Cauteretz and Argelès in the south-west, on its way to join the Adour; the GERS and the Baise, feeders of the Garonne, and the Larros, a tributary of the Adour, which drain the north-east of the department. The Alaric canal serves for the irrigation of the plain on the right bank of the Adour; it is about 30 miles in length, and turns above 60 mills. It commences below Bagnères, passes a little E. of Tarbes, through Rabastens, and enters the Adour below Maubourguet. This canal was opened in the year 507.

The climate is in general good and healthy, the temperature in the plains of Bigorre is mild, but, as may be expected from the nature of the surface of the department, any temperature almost may be obtained by varying the elevation. All the atmospheric phenomena succeed each other in the highlands with remarkable rapidity and inconstancy. The prevailing wind blows from the south-west, and it is attended very frequently with violent rains. The spring is mild, but sometimes late frosts are destructive to the young vegetation; summer is dry and windy; the autumn is invariably fine and clear; the winter foggy.

The common corn products of the department are insufficient for the consumption; buck-wheat, maize, potatoes, figs, mulberries, &c., are also grown. About 6,000,000 gallons of good white and red wines are made annually. Horned cattle and sheep are very numerous; good butter and cheese are made; mules, asses, and horses are reared, and also pigs and large numbers of poultry, especially geese, the legs of which are salted for export. Bees are carefully tended, and honey and wax are abundant.

Iron, copper, zinc, lead, manganese, nickel, and cobalt, are found, but no mines are worked; marble of different colours, building stone, slate, granite, amianth, kaolin, marl, fullers' earth, and potters' clay, are raised. Mineral and hot springs abound.

The commerce of the department is limited to cattle, corn, mules and horses for Spain, timber, oak-staves, hoops, the agricultural products before named, some linen, cotton and woollen stuffs, cutlery, nails, hides, &c. About 80 fairs are held.

The department contains 1,118,909 acres, distributed among 77,234 proprietors, and into 675,129 parcels. Of the whole area, about 236,000 are under the plough; 110,000 acres consist of grass land; 38,000 are planted with vines; 256,000 are covered with woods and forests; 430,000 acres consist of heath, moor, or mountain pasture; and about 20,000 acres are occupied as orchards, gardens, nurseries, &c.

The department is divided into 3 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Tarbes . . .	11	197	112,553
Argelès . . .	5	102	42,917
Bagnères . .	10	202	95,815
Total. . . .	26	501	251,285

Of the arrondissement of Tarbes, and of the whole department, the chief town is *Tarbes*, which is prettily situated on the left bank of the Adour in 43° 13′ 58″ N. lat., 0° 4′ 41″ E. long., at a distance of 24 miles E. by S. from Pau, and has 12,425 inhabitants. The streets are wide, regular, and clean, the waters of the Adour being distributed by canals through all parts of the town; the houses are low, built of marble, boulders, and bricks, and covered in with slates. There are three handsome squares, and outside the town a beautiful walk called the Prado. Of the old ramparts there is no longer a trace; but the ancient castle of the Counts of Bigorre still stands, and is now used as a prison. The other remarkable buildings are the prefect's residence, formerly a bishop's palace, the hospital, the theological and communal colleges, the Ursuline barracks, once a convent, the normal school, the baths, the bridge over the Adour, and the theatre. There are also a handsome cathedral and two churches in the town, which has manufactures of paper and leather, and a good trade in wine, iron, hides, cattle, agricultural produce, &c. The view of the Pyrenees from this place is much admired. Edward the Black Prince kept his court in Tarbes. *Maubourguet*, N. of Tarbes on the Adour has a remarkable church, built by the Templars, and 2202 inhabitants. *Ossun*, S.W. of Tarbes, has a population of 3016. On a hill near it there is an ancient Roman camp, which local tradition says, was laid out by Cæsar's lieutenant, Crassus. *Vic-en-Bigorre*, a small town surrounded by larger suburbs, is situated 12 miles N. from Tarbes, and has a college, brandy distilleries, tanyards, and 4644 inhabitants. It was formerly defended by a strong castle, built in 1151, and of which there are still some remains. The places that give names to the other cantons are mere villages.

The arrondissement of Argelès takes its name from *Argelès*, a small town with a college and 1589 inhabitants, situated at the northern entrance

of the beautiful valley of Lavedan, on the left bank of the Gave-d'Azan, a feeder of the Gave-de-Pau, 18 miles S.S.W. from Tarbes. *St.-Pé*, situated in a country rich in copper and lead mines, on the right bank of the Gave-de-Pau, 7 miles N.W. from Argelès, has a population of 2972, who manufacture nails and boxwood combs, and export roofing slates. *Lourdes*, 5 miles E. of St.-Pé, stands on the Gave-de-Pau, and is built at the meeting of five high roads round a rock, surmounted by an old castle of the Counts of Bigorre, and on the slopes of a ravine which is traversed by a torrent. The houses are pretty well built, but from the nature of the ground the streets are irregular. The town has a tribunal of first instance, and 4146 inhabitants. It is a very ancient place; remains of ancient towers, said to be of Roman construction, are seen here. By the treaty of Bretigny, this town, with the rest of Bigorre, was ceded to the English as part of the ransom of the French King John. The history of Lourdes forms an admirable story in Froissart. A few miles S. from Argelès, at the small village of Pierrefitte, the road diverges into two branches which lead, through narrow gorges separated by a mountain mass above 7000 feet in height, to the famous hot springs of *Cauteretz* and *St.-Sauveur*. Cauteretz is about 7 miles from Pierrefitte. The road which leads to it is cut with great engineering skill, and presents some of the finest mountain scenery in this part of the Pyrenees. The baths are very numerously frequented in July and August. About 6 miles from Cauteretz is the famous *Pont-d'Espagne*, a bridge consisting of a number of pine trees thrown across a narrow chasm in the rocks, into which two mountain streams leap and unite, while the sides of the ravine are covered with dark pine forests, diversified here and there by granite cliffs that shoot up into spires and pinnacles. Not far from the Pont-d'Espagne are the *Lac-de-Gaube*, the largest lake among the Pyrenees, and near it the *Vignemale*, one of the highest mountains in France. The road to the baths of St.-Sauveur passes through *Luz*, 9 miles S.E. from Pierrefitte, the narrow gorge presenting scenery similar to that already noticed. Luz is a clean village situated at the foot of the Pic-de-Bergoms, a high mountain of easy approach, commanding a magnificent view, and on a crystal stream that flows with great rapidity through the ravine in which the town stands. The population of Luz is 2640. The church, which was built by the Templars, is a remarkable structure, a good deal resembling a fortress. Half a mile S.W. of Luz are the hot baths of St.-Sauveur, and about 2 miles N.E. are the still more famous baths of *Barèges*. Barèges is inhabited only during the summer and autumn, at which time it is visited by about 1300 invalids. The springs are the highest in the Pyrenees, the winters consequently are long and cold, so that no population remains, except a few people who take care of the houses in the village.

The arrondissement of Bagnères is named from its chief town BAGNE'RES-DE-BIGORRE. *Arreau*, situated in a beautiful valley at the confluence of the Neste with the Gave-de-Louron, has 1593 inhabitants. *Campan* is a well-built town, situated on the Adour, about 4 miles S.S.E. from Bagnères, in a very rich and fertile valley, and has a population of 4058, who manufacture woollen cloth, paper, and export marble from the quarries in the neighbourhood. There is a large grotto near the town filled with beautiful crystallisations. The other cantons are named from mere villages.

The department forms the see of the Bishop of Tarbes; is included in the jurisdiction of the High Court and University Academy of Pau; and belongs to the 11th Military Division, of which Bayonne is head-quarters. Under the late monarchy it returned 3 members to the Chamber of Deputies; it now has 5 representatives in the Legislative Assembly of the Republic.

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PYRÉNÉES-ORIENTALES, a department in France, formed out of Roussillon, and portions of Cerdagne and Languedoc, and named from its position at the eastern extremity of the Pyrenees, lies between 42° 20′ and 42° 55′ N. lat., 1° 44′ and 3° 10′ E. long. From E. to W. its greatest length is 75 miles; from N. to S. 35: the area is 1589.3 square miles and the population in 1846 was 180,794, which gives 113.75 to the square mile, being 60 below the average per square mile for all France.

The department is bounded S. by the main ridge of the Pyrenees, except at one or two points where it encroaches on their southern slopes; W. by the Val d'Andorre and Ariège, from which last it is separated by an offshoot of the Pyrenees on the left bank of the Aube; and N.W. and N. by the department of Aube, from which the Corbières mountains on the right bank of the Aube divide it; and E. by the Mediterranean and the southern part of the Etang-de-Leucate. A plain of considerable width, and in general of great fertility, extends along the coast, which, reckoning all its indentations, measures about 45 miles. The interior is traversed by two ranges of mountains, one of which springs from Mont-Canigou, the highest point in the department (9135 feet), and, curving from S. to E., divides the basin of the Tech from that of the Tet; the other range runs from W. to E. between the Tet and the Gly, into which last the Verdouble runs from the south-eastern slopes of the Corbières. All these mountains are furrowed by numerous valleys and by streams that enter the principal rivers already named, which fall into the Mediterranean. A small portion in the west of the department is drained by the Aube, which flows out of Pyrénées-Orientales by the defile between the Roc-Blanc and the Corbières mountains. On the southern slope of the Pyrenees, and not far from the sources of the Tech and the Aube, the Segre, a Spanish river, takes it rise. None of these rivers are navigable, but the waters of most of them are turned to good account for fertilising the land by means of an excellent and extensive system of irrigation, whereby, in the plain of Perpignan, the valleys of the Tet, the Tech, and the Gly, not less than 70,000 acres of land, are rendered exceedingly productive. Two

canals, namely those of Millas and Perpignan, date respectively from the years 1163 and 1172: the latter is nearly 20 miles long, with a mean breadth of 10 feet and a total fall of 300 feet.

The soil in the plains of the arrondissement of Perpignan consists of a layer of vegetable earth about a foot deep, resting on sand or gravel. By careful husbandry and by an extensive system of irrigation it is made to produce fine crops of wheat, rye, black and white oats, maize, millet, barley, broad and haricot beans, flax, hemp, fruits, &c. The olive and the vine are extensively cultivated. The arrondissement of Ceret, drained by the Tech, is with little exception a cold mountainous country, cut up by narrow arid valleys; placed above the region of the vine, it produces only rye, oats, maize, chestnuts, and pulse. The arrondissement of Prades, also very mountainous, is diversified by several ranges of vine-clad hills, and by valleys inferior neither in soil nor cultivation to the plain of Perpignan, which it also resembles in its products. The corn produce of the department exceeds the consumption. Of wine about 7,000,000 gallons are made annually. The red wines of Roussillon are in general of excellent quality, agreeable taste, strong body, and well adapted for transport; they are used for giving colour and body to the lighter growths of Cahors and Auvergne. The wines of Collioure and Port-Vendres have the highest repute; they fine themselves and become of a golden hue with age; in this state they take the name of *Rancio de Roussillon*. The sweet wines of Rivesaltes hold the first rank among the dessert wines of France.

The mountains of the department are in many parts clothed with fine forests of oak, beech, pine, and fir, and abound with aromatic and medicinal plants. The cork tree grows naturally, and is also an object of careful cultivation. There is but little grass land, but the breadth of heath, moor, and mountain pasture, is very considerable. Good farm and saddle horses, a great number of mules for the Spanish markets, few horned cattle, but a large number of sheep, common and Thibet goats, are bred. Bees and silkworms are carefully tended; poultry, game, and fish, are abundant.

A great number of iron mines are worked, and the ore is smelted, and converted into malleable iron at 175 forges and furnaces, by means of charcoal prepared on the spot. Copper, lead, bismuth, and alum, are found. A coal mine is worked near Estavar; marble, alabaster, granite, and steatite, are quarried. There are a great number of hot and mineral springs, the most frequented of which are those of *Amélie-les-Bains*, formerly called *Arles-les-Bains*.

Besides wine and iron, the industrial products include coarse woollen cloths, leather, corks, knit stockings and caps, brandy, whip-handles, common pottery, tiles, and bricks. The fisheries on the coast are actively plied, and large quantities of sardines and anchovies are preserved. The coasting trade in the leading articles named, and in wool, oil, honey, &c., is active. About 30 fairs are held in the year.

High roads lead from Narbonne and Carcassone to Perpignan, whence southward there are three others—one leading to Port Vendres; another to Spain, by the port or col of *Pertus*, commanded by the fortress of Bellegarde; and a third which crosses by the port of *La-Perche* to Puycerda in Spain, where it is joined by the road from Toulouse, up the valley of the Ariège through the port of *Puymorens*. Another road through Céret enters Spain near *Prats-de-Mollo*.

The climate is good: the heats of summer in the plains are moderated by sea-breezes; in winter the cold is not intense; snow rests only on the mountains of the Canigou and about Mont-Louis; if it falls elsewhere, it disappears in three days at most. The south-west wind, called *la marinada*, which brings moisture, and the *tramontane*, or N.N.W., which is dry, are the prevailing winds.

The language of the inhabitants is a mixture of the langue d'oc, the Catalonian, and the Castilian.

The department contains 1,017,182 acres, distributed among 54,310 proprietors and into 435,734 parcels. Of the whole area 228,714 acres are under cultivation; 23,907 are grass land; 94,995 are vine-yards; 141,658 are covered with woods and forests; 465,580 acres consist of barren heath and moor; 22,512 are occupied with orchards, gardens, nurseries, and various culture; and 28,354 are covered with rivers, canals, lakes, and marshes.

The department is divided into 3 arrondissements, which with their subdivisions and population are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Perpignan . .	7	85	86,864
Céret . . .	4	50	41,700
Prades . . .	6	113	52,230
Total . .	17	248	180,794

Of the arrondissement of Perpignan, and of the whole department, the chief town is PERPIGNAN. *Elne*, the ancient *Illiberis*, under the walls of which Hannibal encamped on his way to Italy, formerly the seat of a bishop, and one of the strongest towns in Roussillon, stands on the slope and at the foot of a hill near the left bank of the Tech, 8 miles S.E. from Perpignan, and has 2268 inhabitants. The Emperor Constantius was murdered in this town, and his tomb existed till about 80 years ago in the church cloisters. The town presents a wide ruin; its decay was caused by the continual sieges it stood from the French and Spaniards. The church, which was opened Dec. 10, 1058, and consists of three wide naves with a choir in the central one, the whole surmounted by a lofty roof supported on square stone pillars, is a very remarkable structure. *Millas*, 10 miles W. from Perpignan on the right bank of the Tet, has a population of 2095, who trade in corn, brandy, beans, and cattle. *St.-Paul-de-Fenouillet*, a small place on the left bank of the Gly or Agly, and near its confluence with the Boulsane, is built on a height surrounded by arid hills crowned with the ruins

of many an ancient castle, 23 miles N.W. from Perpignan, and has 2000 inhabitants. *Rivesaltes*, prettily situated on the Agly, in a fertile plain environed by vine-clad slopes that yield muscatel wine of superior quality, has 3446 inhabitants, who trade in wine, brandy, flour, wool, &c. The town is 5 miles N. from Perpignan and still has remains of the turreted walls erected for its defence by the kings of Aragon. *Thuir*, a walled town 8 miles S.W. from Perpignan, situated on a small stream, has potteries, tanyards, paper-mills, silk-throwing factories, and 2490 inhabitants. The Spaniards seized this town, June 6, 1793, and held it till Sept. 25 of the same year, when the French drove them out of it.

In the arrondissement of Céret, the chief town, *Céret*, is situated at the foot of the Pyrenees, 17 miles S.S.W. from Perpignan, and has a tribunal of first instance, a college, and 3325 inhabitants. The town, which is surrounded by high tower-flanked walls, stands near the right bank of the Tech, which is passed by a very high bridge of a single arch. It is ill built with narrow, badly-paved streets; corks, leather, and copper-ware, are the chief industrial products. *Argelès-sur-Mer*, 16 miles E. from Céret, and about 2 miles from the Mediterranean, has a population of 2136. S. of Argelès is the small village of Ecluse, and near this the strong fortress of *Bellegarde*, built on a high hill, and commanding the cols of Pertus and Punissas, by which communication is kept up between France and Spain. *Arles-sur-Tech*, situated W. of Céret on the left bank of the Tech, is a well-frequented market-town with 2384 inhabitants, who manufacture oak staves, hoops, leather, and iron, and trade in wine and corn. Near Arles are the hot springs and baths of *Amélie-les-Bains*. *Collioure*, an ill-built town with a small harbour, and 3476 inhabitants, is situated on a hill above the sea, 22 miles E. from Céret. The harbour, which admits small craft only, is defended by several forts. Cork-cutting, and tunny and sardine fishing are the chief employment of the inhabitants, who also trade in wine, salt fish, &c. Near Collioure is *Port-Vendres*, the ancient *Portus Veneris*, a small fortified town with a tolerably good natural harbour, a lighthouse, and 1305 inhabitants, who trade in corn, wine, and brandy. *Prats-de-Mollo*, an irregularly-built fortified town of 3710 inhabitants, is situated 20 miles S.W. from Céret on the left bank of the Tech, in a wild country surrounded by savage mountains. It is built on the slope of a hill which is surmounted by the principal church. The defences are old, and consist of a wall strengthened by gothic round towers and several bastions. Broadcloth, swanskin, woollen hosiery, and whip handles, are the chief industrial products. Near this town are the sulphurous hot springs of *Preste*.

Of the arrondissement of Prades the chief town, *Prades*, is situated 25 miles S. by W. from Perpignan on the right bank of the Tet, and has a tribunal of first instance, a college, an ecclesiastical school, and 3331 inhabitants. The town stands in a vast plain surrounded by high hills, at the foot and on the slopes of which are several villages; it has a handsome church and a well-built hospital. Woollen cloth, brown paper, and leather are manufactured; and there is considerable commerce in corn, excellent fruits, wine, flax, hemp, hides, fine wool, and cattle. *Mont-Louis*, a small, regularly-built fortified town was erected under Louis XIV., on a rugged rock, commanding the bridge over the Tet on the road into Spain by the Col-de-la-Perche. The situation is bleak and cold in the extreme. The town consists of 8 straight streets of symmetrically-built houses; there are two squares, and good barracks; the whole is defended by parapets, bastions, glacis, &c., and by a citadel. The population is only 1084. Lichen abounds in the neighbourhood; the savage wildness, the waterfalls, and the frightful chasms of the gorge through which the Tet hurries in its noisy course near this place, deserve to be mentioned. *Olette*, 10 miles from Prades, situated in a gorge on the left bank of the Tet, where that river is joined by two torrents, has 1209 inhabitants. *Vinça*, 5 miles E.N.E. from Prades, is situated in a fertile plain near the right bank of the Tet, and is a spot abounding with springs of the purest water. It retains still some remains of its old fortifications, consisting of walls and towers. The town, which is ill built, has two pretty suburbs, a college, and 2040 inhabitants, who trade in hides, corn, fruits, flax, hemp, and cattle.

The department forms the see of the bishop of Perpignan; it is comprised in the jurisdiction of the High Court and University-Academy of Montpellier; and belongs to the 10th Military Division, of which Perpignan is head-quarters. Under the late monarchy it returned 3 members to the Chamber of Deputies; it now has 4 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1849.)

PYRETHRUM, a genus of Composite plants belonging to the tribe *Asteraceæ*. *P. Parthenium*, Feverfew, was once a popular remedy in ague. It is said that the odour is peculiarly disagreeable to bees, and that these insects may be easily kept at a distance by carrying a handful of the flower-heads. It is common in many parts of Europe and in England. *P. inodorum* is found in fields and waste places in Great Britain. *P. maritimum* is found on sea-shores in Great Britain. *P. officinale* is the Pellitory of Spain, once much esteemed as a sialogogue, and resorted to for relief in toothache.

PYRGO'TELES, the most eminent engraver of gems of his age. Alexander the Great conferred the same honour upon Pyrgoteles that was extended to Lysippus and Apelles, who had the exclusive privilege of representing him in their respective arts. No well-authenticated work of Pyrgoteles has reached our times.

PYRITES. [Copper; Iron.]

PYRMONT, a county belonging to the Prince of Waldeck, about 35 square miles in extent, with 6500 inhabitants, whose chief occupations are agriculture and the breeding of cattle, lies between Lippe-Detmold, Prussia, and Hanover. It yields the prince a revenue of about 8500*l.*, of which the

mineral springs alone produce nearly 2000*l.* *Pyrmont*, the capital, is a well-built town, of about 2900 inhabitants, at the northern extremity of a romantic valley on the Emmer, a feeder of the Weser. The principal street, shaded on both sides by lofty lime trees, leads to the great avenue and to the celebrated chalybeate springs, of which there are four. The great bathing-house, which contains 140 apartments, tastefully fitted up, and handsome spacious baths, is the most important structure in the place. There is likewise a salt spring at which other baths have been fitted up. A few hundred paces from the great avenue stands the palace of Pyrmont, the residence of the Prince of Waldeck. Above 300,000 bottles of the water from the principal chalybeate spring are exported annually.

PYROLIGNEOUS ACID. [ACETIC ACID.]

PYRO'METER, a term which literally means 'fire-measure,' and was first employed by Musschenbroek to designate an instrument invented by him for measuring the effects produced in the dimensions of solid bodies by the application of heat; but the signification of the term has since been extended so as to include those instruments the object of which is to measure all gradations of temperature above those which can be indicated by the mercurial thermometer.

Musschenbroek's Pyrometer consisted of a metallic bar, about six inches in length, one extremity of which was fixed, while the other was left free to advance as the metal elongated from the effect of several spirit-lamps placed beneath, which, at each experiment, were charged with the same quantity of highly-rectified spirit of wine. The advance of the movable extremity gave motion to a pinion and wheel, the latter of which drove an index over a graduated circle, each degree of which corresponded to a linear expansion of 12,500th of an inch. The instrument, as it was originally constructed, is described in the second part of Musschenbroek's translation of the 'Saggi di Naturali Esperienze fatte nell' Academia del Cimento,' Leyden, 1731; and as improved by Desaguliers (who substituted fine cords and friction-rollers for the wheel and pinion), in the first volume of his 'Experimental Philosophy,' p. 444.

To Musschenbroek's pyrometer succeeded various others, which are described in the 'Philosophical Transactions' for 1736, p. 297; 1751, p. 485; 1754, p. 598; and in 'Ferguson's Lectures,' vol. i., pp. 14 and 301. These instruments, as well as those that have been since constructed, evince, with few exceptions, but little originality in the principle upon which they rest, and are liable to objections from the complicated nature of their adjustment, or from the questionable assumptions of their inventors. In the remainder of this article, the most successful contrivances of late years for indicating the lineal and cubic expansions of solids under the action of heat, or for the actual measurement of high temperatures, are noticed.

Borda's Pyrometer.—The rods employed by Borda in measuring the base-line of the great French Survey consisted of a rule of brass laid upon a somewhat longer rule of platinum and attached at one extremity. The portion of the platinum rule not covered by the one of brass was divided into millionths of its entire length, and further subdivided by means of a vernier and microscope adjusted to the extremity of the brass rule. The value of each of these divisions having been previously ascertained, by first surrounding the compound rule with melting ice, and then immersing it in boiling water, it was only necessary to observe the indications of the vernier in order to apply the requisite correction for reducing the length of the rod to the standard temperature.

Ramsden's Pyrometer.—For low temperatures, the contrivance of Ramsden, described in the 'Philosophical Transactions' for 1785, and employed by General Roy in determining the expansion of the rods used in measuring the base on Hounslow Heath for the Trigonometrical Survey, was perhaps unexceptionable. The rod was immersed in a trough of water, and over each extremity was placed a microscope, to which a slow motion could be given in the direction of the length of the rod by means of a fine micrometer screw. The lines of collimation of the microscopes being thereby adjusted at the commencement of the experiment, so as to accurately coincide with two points near the extremities of the rod, the temperature of the water was gradually raised, till a thermometer placed in the trough indicated an advance of 10°, 20°, 30°, or any required number of degrees. The consequent elongation of the rod destroyed the coincidence of its extremities with the lines of collimation of the microscopes, which was re-established by turning the micrometer screws, and carefully noting the number of turns and fraction of a turn necessary for that purpose; when, the value in parts of an inch of each turn being previously known, a direct measure of the expansion was obtained, free from the errors of a system of levers or of a train of wheels and pinions.

Wedgwood's Pyrometer.—The property of alumina whereby it undergoes a diminution of bulk when heated, was employed by Wedgwood as a measure of high temperatures. His pyrometer consisted of cylinders of fine white clay, and an apparatus for accurately measuring their length. This apparatus consisted of a metallic plate, upon which were fixed two brass rules slightly inclined to each other. The rules used by Wedgwood were 24 inches long, and divided into 240 equal parts. The distance between the rules at one extremity was three-tenths and at the other five-tenths of an inch; consequently the difference between their distances at any two consecutive divisions was the 1200th part of an inch. The clay cylinders were first baked at a red heat (about 947° Fahr.), and then reduced to exactly five-tenths of an inch in length, so as to fit the first division of the scale. When afterwards exposed to a greater heat they underwent contraction, and the amount of this contraction was determined by observing the division of the scale corresponding to their diminished length. A description of the instrument and of the experiments made with it will be found in the 'Philosophical Transactions' of 1782, 1784, and 1786.

MM. Dulong and Petit employed a very direct mode of measuring the *cubical expansions* of various substances. By observing the difference of altitude at which mercury of different temperatures stood in the two arms of an inverted glass siphon, they determined the absolute expansion of the mercury, and by comparing this with the apparent expansion of mercury in a glass tube, they deduced the absolute expansion of the glass. A cylinder of the metal whose expansion was sought was then placed within a glass tube, closed at one extremity and terminating at the other in a capillary opening, and the rest of the tube occupied with mercury. Upon the whole being heated, a portion of the mercury was expelled equal to the excess of the absolute expansions of the mercury and metal above that of the glass; and as the expansions of the mercury and glass were previously known, the weight of the expelled mercury determined the expansion of the metal.

Daniell's Pyrometer. — The late Professor Daniell, of King's College, London, invented a pyrometer for which the Rumford medal was awarded to him by the Royal Society. A description of it is given in the 'Philosophical Transactions' for 1830, and an account of the experiments made with it is inserted in the 'Transactions' of that and the following years. This instrument, which is complicated in its adjustments, and not free from liability to error in its indications, is described under the article 'Pyrometer,' in the 'Penny Cyclopædia,' where the investigation of a formula for correcting its indications will be found.

Prinsep's Pyrometer.—It remains to notice a paper communicated to the Royal Society by the late Mr. Prinsep, the assay-master of the Mint at Benares, 'On the Measurement of high Temperatures,' and published in their 'Transactions' for 1828. 'The fusing-points of pure metals,' observes that gentleman, 'are determinate and unchangeable; they also comprehend nearly the whole range of temperature. The unoxydable or noble metals alone embrace a range from the low melting-point of silver to the high ignition of platina. There are, it is true, only three fixed points in this scale, but as many intermediate links may be made as are required, by alloying the three metals together in different proportions. When such a series has been once prepared, the heat of any furnace may be expressed by the alloy of least fusibility which it is capable of melting.' As the melting-points of silver and gold are comparatively near to each other, Mr. Prinsep assumed only ten intermediate gradations of heat, the lowest of which corresponded to the fusing-point of pure silver, and the others to the fusing-points of silver alloyed with 10, 20, 30, &c., per cent of gold. From the melting-point of gold to that of platina, he assumed one hundred gradations of heat, which were the melting-points of pure gold and of gold alloyed with 1, 2, 3, &c., per cent. of platina. Among the advantages of this mode of identifying temperatures are:—the smallness of the requisite apparatus, nothing more being needed than a small cupel, containing in separate cells eight or ten pyrometric alloys, each of the size of a pin's head; the indestructibility of the specimens, since those melted in one experiment need only to be flattened under a hammer, when they will be again ready for use; and the facility of notation, since two letters and the decimal of alloy will express the maximum heat: thus S .3 G expresses the temperature of the fusing-point of silver when alloyed with gold in the proportion of 7 to 3; and G .23 P expresses the fusing-point of gold when alloyed with platina in the proportion of 77 to 23. For a more particular account of this mode of determining temperatures we refer the reader to the memoir cited.

A valuable table of the expansions of different substances, collected from various sources by Mr. Francis Baily, is given in the first volume of the 'Transactions of the Astronomical Society,' p. 416.

(Biot's *Physique Experimentale; Philosophical Transactions;* Thomson's *Chemistry;* Brewster's *Cyclopædia;* Lamé, *Cours de Physique*, 3 vols., Paris, 1840; *Annales de Chimie*, xlvi, p. 276; Nicholson's *Philosophical Journal*, vi., p. 89; and the works cited.)

PYROXENE, *Augite*, or *Diopside*, is a hard, variously coloured, translucent crystal, composed chiefly of silica, lime, magnesia, and peroxide of iron.

PYROXYLIC SPIRIT, or *Pyroligneous Æther*, obtained by distillation from wood, is a colourless liquid, has a peculiar penetrating smell, partaking both of alcohol and æther, and its taste is pungent: its specific gravity at 68° is 0.798, and that of its vapour at 212° is 1.120, that of the vapour of water being 1. It boils at about 150° Fahr. It is an extremely inflammable liquid, and burns without residue; and being cheaper than spirit of wine, it is advantageously substituted for it in many of the manufacturing arts. It is capable of combining with chlorine, iodine, and other elementary bodies; it unites also with acids to form various compounds. It consists of $C^1 H^2 O^1$.

PYRRHO, a Greek philosopher, and founder of the Pyrrhonian or first Sceptic School, was the son of Pleistarchus, or Pleistócrates, and a native of Elis, a town of Peloponnésus. He lived about the time of Philip and Alexander, of Macedonia, and was originally a poor painter; but, after having learned the elements of science from Dryson, he followed Alexander the Great in his eastern expedition, and thus became acquainted with the doctrines of the Indian gymnosophists and the Persian magi. During the greater part of his life he lived in quiet retirement, abstaining from pronouncing any decided opinion upon anything, and endeavouring to preserve the greatest calmness and composure under all circumstances. Pausanias (vi. 24, 4) saw his statue in a portico at Elis, and a monument erected in honour of him at a little distance from the town. The Athenians honoured him with the franchise of their city. He died at the advanced age of ninety.

An undisturbed peace of mind (ἀπάθεια) appeared to him the highest object of philosophy. He considered a real knowledge of things to be impossible, and virtue to be the only thing worth striving after. On all occasions he answered his

opponents, 'What you say may be true, but I cannot decide.' He had many distinguished followers and disciples, who are called Pyrrhonii, or simply Sceptics. Their doctrines are best explained by Sextus Empiricus: their object was rather to overthrow all other systems than to establish a new one. The philosophy of Pyrrho and his followers is called Pyrrhonism, a name which, in subsequent times, has been applied to any kind of scepticism.

PY'RRHUS, king of Epirus, born about 318 B.C., was the son of Æácides and Phthia, daughter of Meno the Thessalian. The fabulous genealogies of his family traced his origin to Neóptolemus, whose father Achilles is said to have been honoured as a god by the Epirótæ, under the name of A'spetus. Æacides, who came to the throne after the death of Alexander the Molossian, was driven out of his kingdom. His only son, Pyrrhus, then two years old, would have been put to death but for the care of a few friends, who saved the child's life. He was carried to Glaucias, king of the Illyrians, whose wife belonged to the family of the Æacidæ, and Glaucias educated the infant prince with his own children. In his house Pyrrhus remained until his 12th year. Æacides, who had in the meanwhile returned to his country, fell in a battle against Cassander; and Glaucias led Pyrrhus back to Epirus. A regency was appointed, who governed the kingdom in his name. When Demetrius, the chief adversary of Cassander, was obliged to withdraw his forces from Europe to Asia, Cassander induced the Molossians to expel their king again. Pyrrhus, now seventeen years of age, joined Demetrius, who had married his sister Deidamía. In the battle of Ipsus (301 B.C.), which terminated unhappily for Demetrius and his father, Pyrrhus gave the first proofs of his impetuous courage. When Ptolemæus, king of Egypt, made peace with Demetrius, Pyrrhus went as a hostage to Alexandria, where Berenice, the king's wife, gave him her daughter Antigone by her first husband Philip. Pyrrhus, returning to Epirus, reconciled himself with Neoptolemus, whom the Molossians, during his absence, had raised to the throne, and agreed to share the government with him. But Neoptolemus soon attempted the life of Pyrrhus, who, to secure himself, put Neoptolemus to death, 295 B.C. Secret jealousy had long existed between Demetrius, who made himself king of Macedonia (B.C. 294), and Pyrrhus. After the death of Deidamia, Demetrius carried off Lanassa, the second wife of Pyrrhus, who brought to her new husband the island of Corcýra, which her father, Agathocles of Syracuse, had conquered. Upon this war broke out between the two kings. Pyrrhus entered Ætolia, while Demetrius ravaged Epirus. Pyrrhus met Pantauchus, whom Demetrius, after a successful invasion of Ætolia, had left in command there, and Pantauchus was defeated.

Pyrrhus now invaded Macedonia, where he penetrated as far as Edessa, and was joyfully received by many Macedonians. Lysimachus at the same time made an attack on Macedonia from Thrace. The mild conduct of Pyrrhus during this expedition induced the whole of the Macedonian army to salute him as king of Macedonia (287 B.C.). Demetrius fled into Asia, where he was defeated by the son of Lysimachus, and surrendered himself prisoner to Seleucus. Pyrrhus consented to divide Macedonia between himself and Lysimachus; but the two kings could not long agree, and Pyrrhus withdrew from the kingdom of Macedonia about 288 B.C.

In 281 B.C. Pyrrhus was requested by the Tarentines to give them his assistance against the Romans. The Tarentines said that they merely wanted a general, and that they had a sufficient force of their own. Cineas however was sent by Pyrrhus with 3000 soldiers, and the king followed in Tarentine vessels of transport with an army of 3000 horse, 2000 foot, 2000 bowmen, 500 slingers, and 20 elephants. His son Ptolemæus by Antigone, then fifteen years of age, was left as guardian of the kingdom. A large part of the force of Pyrrhus was lost at sea, and with the remnant he entered Tarentum. He soon discovered that the Greeks were ill adapted to sustain the contest against the Romans, and he assumed the absolute direction of affairs. The troops which the allies had promised the Tarentines did not arrive; and the Lucanians and Samnites were prevented by the Roman consuls from joining Pyrrhus. The king pitched his camp on the north bank of the small river Siris, in the plain between Pandosia and Heraclea. The Romans, who were encamped on the south bank, were ready for battle. The fight lasted the whole day. The elephants were of great advantage to the Greeks; for as soon as the Roman cavalry perceived the huge animals advancing and opening the way for the Thessalonian horse, they fled across the river. The remnant of the Roman army escaped in the darkness of the night, and the victors took possession of their camp. Pyrrhus on the next day visited the field of battle, and buried the bodies of the slain enemies, amounting to 7000, as well as those of his own soldiers. But he purchased this success with the flower of his own army, and he said that another such victory would compel him to return to Epirus.

The field of battle on the river Siris has latterly become a subject of great interest. In the year 1820 two bronzes of the most exquisite workmanship were found not far from the river, near the site of the old town of Grumentum (now Saponara in the province of Basilicata), and within the enclosure of a ruin. These bronzes, called the Bronzes of Siris, which were originally gilt, are each a little more than seven English inches in length. On each of them is represented in very high relief a hero fighting with an Amazon. They are now in the British Museum, and may at first sight be recognised as fragments of a magnificent cuirass. The character and the beautiful style of the work render it certain that they belong to the school, or at least to the period, of Lysippus. They were in all probability brought over to the spot where they were found by some one in the army of Pyrrhus. (Bröndsted, 'The Bronzes of Siris,' an archæological essay, London, 1836.)

After the battle on the Siris, Pyrrhus advanced to within 300 stadia of Rome, and was joined by the Lucanians and Samnites. The Romans, undaunted by their defeat, though deserted by many

of their allies, raised new troops, and determined to try their strength again. Pyrrhus sent his friend Cineas to Rome to negotiate, while he assembled his Italian allies; but Appius Claudius, the blind, persuaded the senate to break off the negotiations. Pyrrhus led his troops back to Campania, where he found the Roman general Lævinus with a numerous army; but neither of the two parties was anxious for battle, and Pyrrhus took up his winter quarters at Tarentum.

In 279 B.C. Pyrrhus began his new campaign, and in the neighbourhood of Asculum in Apulia he met the Roman consuls P. Sulpicius and P. Decius. The Romans were again defeated, but Pyrrhus lost 3500 of his soldiers, and among them the flower of his army; and although he had gained the day, he retreated to Tarentum. He is said to have exclaimed, 'One more such battle and we are lost!' In the year 278 B.C., when the consuls C. Fabricius and Q. Papus had taken the field against Pyrrhus, a traitor belonging to the retinue of the king proposed to the consuls to destroy his master by poison. The Romans are said to have apprised the king of his danger, who, as a reward for their honesty, ordered Cineas to lead all the Roman prisoners back, without ransom, and laden with rich presents. Cineas was also authorised to make peace. The generosity of the king rendered the Roman senate more flexible than before, and although peace was refused unless the king would consent to quit Italy, yet the Tarentine prisoners and other allies of Pyrrhus were sent back, and a truce was concluded, which enabled the king to cross over to Sicily with his army. Pyrrhus had been invited by the inhabitants of Agrigentum, Syracuse, and Leontini, to lend his aid against some Sicilian tyrants and the Carthaginians, who had already taken possession of many towns in the island, and were besieging Syracuse by land and by sea.

After having spent two years and four months in Italy, Pyrrhus landed in Sicily. The Carthaginians withdrew their forces from Syracuse, and they were at last driven from Sicily, with the exception of Lilybæum, where they fortified themselves, and were besieged by Pyrrhus. After a long and useless siege of Lilybæum, the king determined to man his fleet, and make a landing on the coast of Africa. But his severity in compelling the Sicilian Greeks to man his vessels, and his mistrust of them, roused their discontent. The two leading men among them, Thynion and Sosistratus, incurred his suspicions, and one of them was put to death. This act suddenly called forth the hatred of the Sicilians, and some of them threw themselves again under the protection of the Carthaginians. At the same time Pyrrhus received information that the Tarentines and Samnites were no longer able to hold out against the Romans, and quitting the island he hastened to Italy.

In his passage through the straits he was attacked by the Carthaginian fleet, and lost seventy of his ships (276 B.C.). On arriving at Locri he found himself in great difficulties, not being able to pay his soldiers. To satisfy their wants, he took the sacred treasures from the temple of Proserpine. When the treasures were embarked, a storm arose, in which some of the ships were lost; the others, laden with the treasures, were cast back on the coast of Locri.

Having here reinforced himself, he set out against the Romans, and pitched his camp in Samnium. The Romans sent out two consular armies, under Manius Curius, who marched into Samnium to meet Pyrrhus, and L. Cornelius Lentulus, who took up his position in Lucania (275 B.C.). Curius had fortified himself on the hills near Beneventum, wishing to avoid battle until the arrival of Lentulus; but Pyrrhus attacked the Roman general, and was completely defeated. The king's camp fell into the hands of the Romans, and Pyrrhus, with only a few horsemen, escaped to Tarentum. He shortly afterwards quitted Italy for Epirus, with the greater part of his troops. Milo was left behind, with the command of the garrison at Tarentum, and his son Hélenus. On arriving in his kingdom, Pyrrhus found himself unable to provide for the wants of his small band, and he invaded Macedonia in order to gain by plunder the means of maintaining his troops. After making himself master of nearly the whole of Macedonia, he recalled Milo and his son Helenus.

Before Pyrrhus had firmly established himself in Macedonia, he was invited by Cleónymus, a worthless Spartan, to assist him against the king Areus. Pyrrhus advanced to Sparta with a numerous army, but he met with a determined resistance from the women as well as the men of Sparta. He forced his way into the city, but the united exertions of the Spartan men and women drove him from it. At the same time king Areus, who was absent, arrived from Crete; auxiliaries from Corinth also were on their march to Sparta, and Pyrrhus contented himself with ravaging the country. He intended to take up his winter-quarters in Laconia, but another opportunity for action offered itself. Argos was distracted by two factions; one was headed by Aristeas, who called Pyrrhus to his assistance, while Aristippus, his adversary, sought the protection of Antigonus. The king immediately marched towards Argos. On his road he was attacked by Areus, who lay in ambush, and cut off the rear of his army. Pyrrhus left his son Ptolemæus behind to oppose Areus, and proceeded on his road. Ptolemæus fell in a fierce battle, and Pyrrhus, turning back to avenge his death, slew with his own hand Eualcus, who had killed his son.

In the meanwhile Antigonus had occupied the hills near Nauplia, and Pyrrhus pitched his camp in the plain. The Argives, dreading the issue of a battle, promised that their city should not be hostile to either party, if they would not attack it. Antigonus consented, and gave his son as a hostage. Pyrrhus likewise promised to keep peace, but gave no pledge of his intentions. In the ensuing night Aristeas opened one of the gates to him, through which Pyrrhus with his Galatians entered, and took possession of the market-place. The Argives, roused from their sleep by the noise, sent to Antigonus, who immediately advanced with his forces. Areus at the same time arrived

with a select body of Cretans and Spartans. The darkness of the night and the narrowness of the streets produced the greatest confusion among the combatants. At daybreak, Pyrrhus, discovering that all the fortified parts of the city were occupied by armed troops, wished to get out of Argos. While he was making this attempt, he was killed by an old woman, who seeing her son fighting with the king, threw a tile upon his head from the roof of her house.

Pyrrhus died in the year 273 B.C. The Life of Pyrrhus, by Plutarch, is one of the most exquisite specimens of biography.

Coin of Pyrrhus.
British Museum. Actual size. Silver.
The head is probably that of Jupiter.

PYRUS, the Latin word for Pear Tree, is a name now given by botanists to a considerable number of Pomaceous plants, whose collective character is to bear a fruit resembling in all essential circumstances that of the Apple or Pear.

The genus is divided into several sections, the most important of which are—1, the Apples and Pears; 2, the Beam-Trees; 3, the Mountain Ashes; and 4, the Dwarf Crabs.

To the section of Apples and Pears belong not only the well-known fruits so called [APPLE; PEAR], and all their many varieties, but also several species whose fruit is less valuable. On Mount Sinai grows a species called *P. Sinaica*, whose fruit is hard, gritty, and austere; in Germany a similar kind, the *P. nivalis*, is by no means uncommon, with a considerable resemblance to the last; Siberia and Persia produce another, called *P. salicifolia;* and in the former country are found the Siberian Crab, *P. prunifolia*, and the Berry-Fruited Crab, *P. baccata*, whose fruit is too small for ordinary consumption, but is often seen in the form of a sweetmeat. Besides these, the Chinese Crab, *P. spectabilis*, and also *P. coronaria*, are cultivated for their flowers.

The Beam-Trees derive their name from the use that has been made of their tough wood for beams, axletrees, and similar purposes, where great strength is required. It is especially for the cogs in the wheels of machinery that it was used, till superseded by iron. The common Beam-Tree is *Pyrus Aria*, and inhabits the rocks of the west and north of England, where it forms an ornamental object with its dark-green foliage shifting to silvery-white when disturbed by the wind. To this section may be referred without inconvenience the true Service, *Pyrus domestica*, a tree now not uncommon in England, but originally from the south of Europe. Its wood is very compact, and is said to be the hardest and heaviest of any indigenous in Europe.

The Mountain Ash, *P. aucuparia*, is a well-known ornamental tree, with a graceful habit, fragrant clusters of white flowers, and loose bunches of scarlet berries. It is found wild all over Europe and in the north of Asia; a variety occurs with yellow berries. In North America it is represented by a nearly-allied species, *P. Americana*, with large copper-coloured berries, and a third kind, *P. microcarpa*, with very small scarlet fruit. The Mountain Ash is the Rowan-Tree of the Scotch, whose boughs were supposed to be a protection against witchcraft. It forms a hardy and good stock on which to graft the Pear-Tree, when it is desired to dwarf that species.

The Dwarf Crabs are small bushes with dense clusters of white flowers, succeeded by black or red fruit very like that of the Mountain Ash. All are North American, except a Swiss species, *P. chamæmespilus*, and are scarcely cultivated except as objects of curiosity.

PYTHA'GORAS, the son of Mnesarchus, was born about 570 B.C., in the island of Samos. By his mother's side he was connected with the most distinguished families of the island; his father, according to most accounts, was either a Phœnician or a Tyrrhenian of Lemnos or Imbros. The history of Pythagoras is obscured and disfigured by a mass of fables. He is said to have been a disciple of Pherecydes of Syros; and to have been acquainted with all the philosophers of his age. He also visited Egypt, where he was introduced to King Amâsis by letters from Polycrates, tyrant of Samos. From Egypt he went to Asia, where he is said to have made himself acquainted with the science of the Chaldæans and the Magi: some traditions even state that he visited India and the Gymnosophists. On his return from his travels, he did not settle in Samos, but, after visiting various parts of Greece, finally settled at Croton in Southern Italy. The aristocratical party ruled at Croton, and he was well received by them, probably because they thought that his peculiar views would assist them in maintaining themselves against the democratical element. Pythagoras formed a school or institution on philosophical principles, which is generally called the Italian School. It is difficult to say what the philosophical principles of Pythagoras were, because it is not at all certain that he wrote anything, and his opinions may have been distorted and altered by the later Pythagoreans. Philolaus of Tarentum, a disciple of Pythagoras, was probably the first who wrote an exposition of his master's philosophy; and the fragments of Philolaus are therefore the best evidence of the genuine doctrines of Pythagoras. He made number the essence of all things, and attributed to it a real existence. He considered the principles of number in the form of contrasting pairs, as straight and curved, limited and unlimited, one and many, odd and even, and the like. (Arist. 'Metaph.' i. 5.) These first principles again were traced to the unit (μονάς), the formal as well as material basis

of all things, and as identical with the one supreme being, or God. The perfect development of the original unit is represented in the actual world, which consists of small and large wholes of every variety. The special principle of every whole or organisation is again a unit, or a point separating itself from the rest; and, as it is a living germ, it develops itself into a distinct body of peculiar form and proportions. Every abstract idea was thus in reality a number, and physical objects were symbolical representations of numbers.

Many fantastic notions about the heavens and heavenly bodies are attributed to Pythagoras. The souls of men were considered as light particles of the universal soul diffused through the whole world. (Cic. 'De Nat. Deor.,' i. 11.) The soul of man was divided into three parts, νοῦς, φρένις, and θυμὸς: the two former were considered as the rational half of the soul, and had their seat in the brain; the last, or θυμὸς, was the animal half, and its seat was in the heart.

The doctrine of the transmigration of souls may have been derived by Pythagoras from some of the Mysteries. He and his followers considered the transmigration of souls as a kind of purifying process. The souls, previous to their entering into human bodies, floated in the air, from whence they were inhaled by the process of breathing at the moment of birth. At the moment of death, they descended into the lower world, after which they again rose into the upper world, and floated in the air, until they entered into new bodies. When by this process their purification had become complete, the souls were raised to higher regions, where they continued to exist, and to enjoy the presence and company of the gods.

The Pythagoreans, according to Aristotle, were the first who determined anything in moral philosophy. Their ethics are of the loftiest and most spiritual description. Virtue was with them a harmony, unity, and an endeavour to resemble the deity. The whole life of man should be an attempt to represent on earth the beauty and harmony displayed in the order of the universe. The mind should have the body and the passions under control: the gods should be worshipped by simple purifications, offerings, and by sincerity and purity of heart. (See Ritter's 'History of Ancient Philosophy,' i. p. 327, English translation.)

Pythagoras did not consider contemplation as the sole and highest object of man: it was his doctrine that by action as well as by thought the individual as well as the state should represent an image of the order and harmony by which the world was sustained and regulated.

The precise objects of his institutions at Croton are not clear. The perfect state of society, such as he conceived it, depended as much on sound religious and philosophical as on political principles. It was his intention to bring about his reforms by gradually diffusing his enlightened ideas. That it was by no means impossible to give a new form to society, is clear from the reforms wrought by Lycurgus at Sparta, of Zaleucus at Locri, and of Charondas at Catana. Pythagoras established at Croton a society or an order, of which he himself was the head. It consisted of three hundred young men, selected from the most distinguished families of Croton and other Italian cities. The society was, as a modern historian expresses it, 'at once a philosophical school, a religious brotherhood, and a political association.' The earnestness with which Pythagoras went to work, appears from the fact that he admitted none but the ablest men into his society, and that he bestowed the most anxious care on the cultivation of their minds and hearts, in order to render them alive to the highest objects that can engage the human mind, and to make them clearly understand the place which they occupied in the world. The proceedings of the society were transacted in the greatest secrecy. Religion seems to have been the foundation of the society, and that his religious principles greatly differed from those generally received is clear from the tenour of his system; and it is stated that he censured Homer and Hesiod for their profane description of the gods. (Diog. Laert., viii. 19.) Outwardly however he showed great respect for the objects of the popular worship—a prudence which, with his dignified and priestly appearance, was calculated to win the affections of the people, while the purer doctrines which he imparted to his disciples secured their most perfect submission. He instituted among his disciples a secret worship, or Mysteries, which are sometimes called Pythagorean Orgies; and the science of numbers, geometry, and music, and even medicine and gymnastics, including dancing, were closely connected with the sacred rites. Women seem also to have been admitted, if not into the society, at least to some of the lessons of the philosopher. (Diog. Laert., viii. 21.)

As to the political character of the institution, from which we must derive our conclusions respecting his political views in general, it is stated that it was aristocratical, but in the original sense of the term, in which it means the government of the wisest and the best. His object was to establish a rational supremacy of minds enlightened by philosophy and purified by religion. He appears to have had no preference to one form of government over another, except so far as he thought one more favourable than another for the establishment of his principles. He examined those who wished to become members of the society; and, if they were received, they were subjected to a long period of probation, and during the first two years they were forbidden to speak: they were merely hearers. The mode of living of these novitiates was minutely regulated. The doctrine of the transmigration of souls may perhaps have led to the rule for abstaining from animal food. The members lived together. Pythagoras and his order obtained considerable influence in Croton and other Italian towns; but the influence of a kind of secret society, which this was to some extent, becomes suspected and excites hostility. A contest arose between the popular and aristocratical parties in the neighbouring town of Sybaris. Some exiles

of the aristocratical party took refuge at Croton, and when the Sybarites required them to be surrendered, Pythagoras and his associates prevailed on the senate to reject the demand. A war broke out, which ended in the destruction of Sybaris, 510 B.C. The senate of Croton and the Pythagoreans, it is said, refused to share the spoil and the conquered land with the people, and it may have been about this time that the Pythagoreans attempted to abolish the popular assembly. A tumult broke out, in which the house of Milo, where the Pythagoreans were assembled, was burnt: many of them perished in the flames, and the rest only saved their lives by going into exile. Pythagoras himself seems to have been absent from Croton during this insurrection, and is supposed to have died a short time after at Metapontum (about 504 B.C.). Similar insurrections soon followed in several other towns in Italy, where branches of the Pythagorean society had been established. Some Pythagoreans, such as Philoláus, fled to Greece, where they taught their doctrines, and had considerable influence on the philosophy of Plato. The Pythagorean system was revived at a later period, and in the second century of our æra it appeared mixed up with the doctrines of the New Platonists.

Various discoveries in mathematics, music, and astronomy are ascribed to Pythagoras, but it would be difficult to establish the truth of these traditions by historical evidence. We have not thought it worth while to repeat the monstrous mass of fables and miracles which are interwoven in the biographies of Diógenes Laertius, Porphyrius, and Iamblichus. The history of no ancient sage is so obscured by fables as that of Pythagoras.

PY'THEAS, a celebrated navigator, was a native of the Greek colony of Massilia (Marseille). He flourished, according to some authors, before Aristotle; but according to others, in the reign of Ptolemæus Philadelphus. Respecting the circumstances of his life nothing is known. Polybius, who disbelieved the accounts of his voyages, says that he is reported to have made two voyages. In the first he sailed round the western coast of Europe and through the English channel as far as Thule, which is generally supposed to be Iceland. This voyage he described in a work called a 'Description of the Ocean' (περὶ Ὠκεανοῦ), where, among other things, he stated that he had landed in Britain and travelled through it, as far as it was accessible, and that its circumference was above 40,000 stadia. In his second voyage he sailed along the whole western coast of Europe, from Cadiz into the Baltic as far as a river which he called Tánais, on the banks of which amber was found (Plin., 'Hist. Nat.,' xxxvii. 2). Pytheas was also a mathematician and an astronomer. The ancient writers differed much in their judgment of Pytheas. Eratosthenes adopted his statements in preference to others; but Polybius, and particularly Strabo, speak unfavourably of him. The few fragments of his works were collected by Andr. Arw. Arwedson, Upsal. References to the various writers who have treated of Pytheas are given by Forbiger, *Handbuch der Alten Geographie*, i. p. 148, &c.

PYTHIA. [DELPHI.]

PYTHIAN GAMES (*Pythia*), one of the four great national festivals of the Greeks, were celebrated near Delphi, in honour of Apollo, originally every ninth year, and afterwards every fifth year in the autumn of the third year of each Olympiad, in the second or third month of the year, according to Clinton. Corsini and others, followed by Boeckh, place them in the spring, in the month Munýchion, the tenth of the year. It is stated by Pausanias and Strabo that the contest was originally in music: the songs (πυθικοὶ νόμοι) were in honour of Apollo, celebrating his victory over the Python; and the instrument used was the lyre. The prize in the Pythian games was originally of silver or gold; but afterwards a crown of laurel, or, according to Ovid, of a species of oak (*æsculus*), for which the laurel was afterwards substituted. [OLYMPIAN GAMES.]

PYTHON, M. Daudin's name for the great constricting serpents of the Old World.

In the article BOA will be found much that relates to Python. The organization of both is so similar, that a repetition becomes needless. Like the Boæ, the Pythons have processes or hooks near the anus, and narrow ventral plates, and indeed the latter can hardly be said to differ from the former, except in the double plates beneath the tail. Their head has plates on the end of the muzzle, and there are fossets on their lips.

The powerful dental machinery by which a firm hold is gained as a fulcrum for the constriction, and the adaptation of the bones of the head to the dilatation necessary for swallowing the disproportioned prey, are the same as in BOA.

The species most frequently brought to this country is the Tiger Boa (*Python Tigris*), from the Sunda Islands, which attains not unfrequently to upwards of 30 feet in length.

Dr. Andrew Smith, in his 'Illustrations of South Africa,' describes a gigantic and terrible species as *Python Natalensis*. It is now found only in the interior of the regions of the Cape hitherto visited, and Dr. Smith saw a skin of one which measured 22 feet, though a portion of the tail part was deficient. It is dreaded by the natives, who however refuse to destroy it from an idea that it has an influence over their destinies.

PYXIS NAU'TICA (the Mariner's Compass), a southern constellation of Lacaille, placed in Argo.

Q is a superfluous letter of the alphabet, having the same sound as *k*, though limited to words where a *u* follows. This letter furnishes evidence that the alphabetical characters were originally of syllabic power. Thus the Hebrew koph and the Greek koppa appear to have been used only in those words where the sound of *o* follows, as in *Cos*, *Corinth*, and *Syracosii*, &c. Indeed the name of the letter implies as much. The Greek alphabet probably stopped at one period, like the Hebrew, at *τ*, so as to have no *u*. On the other hand, the Etruscan alphabet had a *u* but no *o*. Hence in Italy, the *q*, which, by position in the alphabet, corresponds to the Greek koppa, was limited to words where a *u* followed. In the same way the kaph of the Hebrew and kappa of the Greek were probably at first limited to those words where an *a* follows, as we know was the case in Latin; and as the modern name of the letter, *ka*, denotes, for it would otherwise have been called *ke* or *ek*. This view becomes more complete if it be called to mind that the name of *χ* connects it with the vowel *i;* and that the *η* or H of the Greek alphabet was originally a guttural aspirate, sounded perhaps as *χη*, and thus was adopted to denote either a guttural consonant or a long *e*. Although *q* is generally followed by a second vowel after its *u*, the older practice of the Romans did not so limit its use. Thus, *Pequnia*, *Pequdes*, *qum*, *equs*, are met with. For the various changes to which the letter is subject, see C and K.

QUADI, an ancient people of Germany, who inhabited the country north of the Danube, between that river, the mountains of Bohemia, and the river March. Tacitus ('German.' 42) mentions the Quadi, the Marcomanni, and the Narisci, as being in the foremost rank among the German nations towards the borders of the Roman Empire, the Danube forming the line of demarcation between the power of Rome and German independence. The Quadi joined a great confederacy of German nations against Rome, which occasioned much alarm to the Empire, and twice obliged the Emperor Marcus Aurelius Antoninus to repair to Germany at the head of his legions.

QUADRANGLE and QUADRILATERAL (four-angled and four-sided). These terms are indiscriminately used to denote a figure with four sides in the same plane.

QUADRANT (*Quadrans*) originally meant simply the fourth part, but is now in universal use for the fourth part of a circle.

QUADRATIC, BIQUADRATIC (*quadratum*, a square), names given to algebraic expressions, the highest powers of which are the square, and the square of the square, or fourth power, of the letter with reference to which the expressions are considered.

QUADRATURE. By the quadrature of a curve is meant the finding of a square equal to the content inclosed by the curve; but as every rectilinear figure can be immediately converted into a square of equal magnitude, the object is gained as soon as any rectilinear figure is found of the same content as the curve. This is the geometrical quadrature of a curve. The arithmetical quadrature is the determination of the area inclosed by the curve in terms of a given square unit, as a square foot; and if this be done with any required amount of accuracy, the quadrature, thus done sufficiently for practical purposes, is spoken of as an absolute quadrature.

QUADRATURE OF THE CIRCLE. The speculative part of this question might be passed over with a slight description of the means of finding a square equal to a given circle, or of expressing a circle by means of the square on its radius, if it were not that it is connected with one of those propensities, the love of the marvellous, which, carried to an undue extent, tend more than others to throw the mind off its balance, and destroy the comfort of the individual. When it is considered that there are still persons who spend their time, means, and energies, in the attempt to overcome a difficulty of which they do not even know the character, it is worth while to enter a little more at length upon this celebrated question of the Quadrature of the Circle than its mathematical importance would seem to require.

It is a proposition not very difficult of proof, that, if a right-angled triangle have the radius of a circle for its base, and a line equal to the circumference for its altitude, the triangle is equiareal with the circle. Hence the quadrature is reduced to the finding a line equal in length to the circumference, either geometrically or arithmetically; or to finding an answer to one or other of the following questions:—

Given *a*, the *diameter* of a circle in units of a given kind, required a number or *fraction* *π*, such that *a* multiplied by *π* may be *the number of* those same units in the circumference. It is easily shown that this number *π* must be the same for all circles.

Given the diameter of a circle, required *geometrically* a method of drawing a straight line equal in length to the circumference.

Those who first proposed these questions, found their progress arrested by the insufficiency of their arithmetic and the limitations of their geometry. The former question has long been settled, and it has been shown that the ratio of the circumference

to the diameter is incommensurable. The latter question cannot be called finally settled, since there is no proof in which all agree that the geometrical quadrature is impossible, though there are considerations which render it in the highest degree unlikely, and there are also asserted proofs of the impossibility which some admit, and which make even those who do not absolutely admit them think their conclusion all but proved. But the mistake of those who produce pretended quadratures often lies in this, that they do not know what is meant by the word *geometrical*.

They imagine that anything is geometrical which deals in notions about space, and deduces that which is not obvious from that which is. But geometry, in the technical sense, is that which results from the use of Euclid's postulates, which permit nothing but the junction of two points by a straight line, the indefinite production of that joining line, and the description of a circle with a given centre, and the line joining that centre with another given point as a radius. These limitations make the whole difficulty; otherwise nothing would be more easy than to determine a circle by the quadratrix, if that were allowed to be drawn, or to suppose a circle to roll on a straight line till the point which first touched the straight line touches it again, in which case the line rolled over is the length of the circumference. When therefore any one imagines, as is often the case, that he has found a *method of squaring* the circle, it generally happens that he only announces the not very new nor surprising fact, that a difficulty which exists under certain circumstances may be no difficulty at all under others. But in like manner as no one would be held likely to answer the question 'required the way of *building* a house without the use of iron' who should first demand a hammer and nails, so persons who attempt to square the circle must not be supposed to meet the geometrical difficulty, by assuming powers of which geometry expressly requires the use to be abandoned, until it can be shown to be given in allowing the simple postulates above mentioned.

Archimédes, in his book on the mensuration of the circle, is the first who made any approach even to a practical determination of the question. By inscribing and circumscribing a polygon of 96 sides in and about the circle, he demonstrates that the excess of the circumference over three times the diameter must be less than 10·70ths of the diameter, and greater than 10·71st parts. His statement is perfectly correct, and even tolerably accurate. According to him a circle of 4970 feet diameter would have a circumference lying between 15,610 and 15,620 feet, the truth being that such a circle would have a circumference of 15,613¾ feet very nearly.

Among the Hindoos [VIGA GANITA] are found the ratios of 3927 to 1250, and also that of the square root of 10 to 1. The first gives $\pi = 3.1416$ exactly, and is considerably more correct than that of Archimedes; the second gives 3.1623, and is much less exact. The date of the first result is not known; but all agree that the writings in which it is found are anterior to any European improvement on the measure of Archimedes.

Peter Metius, father of Adrian (to whom it is often attributed), and of James (to whom the invention of the telescope has been given), made a decided improvement. He gives the ratio of 355 to 113, or 3.14159292, which is correct to the sixth decimal inclusive. Nothing more precise could be desired for practical purposes, insomuch that a circle of 113 in diameter may be reckoned as one of 355 in circumference, which, though a little too great, does not give the circumference wrongly by so much as one foot in 1900 miles. Vieta gave a still more accurate though not so elegant a measure. Ludolph van Ceulen, by calculating the chords of successive arcs, each of which is the half of the preceding, found the perimeter of a polygon of 36893488147419103232 sides, and obtained 36 figures of the ratio 3.14159, &c., presently given to a still greater length. So far the method of calculating by means of inscribed polygons had received no material simplification. This was given by Snell.

The invention and cultivation of the differential calculus led to many new views and new methods, into which it is not our purpose to enter, as we intend the present article not for mathematicians, but for those who have just enough of the science to think it possible that the solution of the problem is reserved for them. The continued product of Wallis, the continued fraction of Brounker, the series of Mercator, Gregory, Newton, &c., were so many new algebraical expressions of a result which, one might imagine, would be considered as carried far enough by the arithmetician. Nevertheless the ratio was consecutively carried to 75 places by Abraham Sharp, to 100 by Machin, and to 128 places by De Lagny, and at the end of the last century to 140 places by Vega. And Baron Zach informed Montucla that he had seen a manuscript in the Radcliffe Library at Oxford, in which it was carried to 154 places.

Vega's result, which, as far as it goes, is confirmed by those of Machin and De Lagny is as follows:—

3.14159 26535 89793 23846 26433 83279
50288 41971 69399 37510 58209 74944
59230 78164 06286 20899 86280 34825
34211 70679 82148 08651 32823 06647
09384 46095 50582 26136

But the Oxford manuscript gives as the ending (according to Montucla)—

46095 50582 23172 53594 08128 4802

So far as these agree, there is no doubt of their correctness, so that the approximation has been carried to 135 decimals certain; and more recently to 200 places.

Montucla has given a tolerable list of those who have signalised themselves by attempting this problem without the requisite preliminary of studying geometry, if preliminary that may be called, which would have made them give up the attempt. They existed in crowds in the time of Archimedes; and the race is not yet extinct. An account of some of them is given in the 'Penny Cyclopædia.'

A few words may serve to prevent some one

from making an attempt upon this enchanted castle, as it is supposed to be. When the difficulty first began to be noticed, the circle stood alone among curves; and so remarkable a distinction between this, the only curve then considered, and rectilinear figures, the only other figures then considered, could not but excite curiosity. Our position is now changed. Not only does the now well recognised distinction of commensurable and incommensurable prevent the circle from presenting anything peculiar to itself, but the curve is only one among an infinitely great number, many of which have been investigated and their properties examined. Consequently, with reference to the present state of mathematics, the problem analogous to that of squaring the circle is, 'Given any curve whatsoever, to find its area.' Now if the ingenuity which is guided by the love of investigating hidden things, should desire a field for its exertions, let it leave that of the circle, which has been cropped until it will yield no more, and, first acquiring sufficient mathematical knowledge, let it spend its force upon some one of the many real difficulties which abound, both in the pure and mixed sciences: let it investigate the meaning of divergent series for example, in all their varieties, or endeavour to extend the theory of discontinuous expressions, or solve the equations of motion of the solar system by some other method than that of series. For one point that should strike the lover of the marvellous in the quadrature of the circle, there are hundreds in the above-named subjects which surprise the mathematician.

Strange as it may seem, this problem of the quadrature of the circle still engages attention; and persons are found to believe that they have attained even the arithmetical quadrature. It has been stated in foreign newspapers within these few years that the British government does offer, and always has offered, a large reward for the solution of this problem. This, we need hardly say, is a complete mistake: the government never at any time offered one farthing for the quadrature of the circle. The only problem, for the solution of which any reward was at any time offered, was the practical mode of finding longitude: and even this offer is now retracted; rewards having been, in fact, received by several persons. Should this article fall into the hands of any, at home or abroad, who are working at any mathematical or astronomical difficulty under the impression that our government is pledged to remunerate them in case of success, they may rest assured that their information is incorrect, and that they will find it to be so on inquiry.

QUA'DRIO, FRANCESCO SAVE'RIO, a learned Jesuit of the 18th century, a native of Valtellina, wrote an historical and descriptive work on his own country, which he dedicated to Pope Benedict XIV.: 'Dissertazioni Critico-Storiche intorno alla Rezia di quà dalle Alpi oggi detta Valtellina,' 3 vols. 4to., Milan, 1755. It is the best account which we have of that secluded region. But the principal work of Quadrio is his general history of poetry in all ages and countries, 'Storia e Ragione d'ogni Poesia,' 7 vols. 4to., Bologna and Milan, 1741–52, a laborious work containing a vast deal of information not found collected in any other compilation. Before his death Quadrio quitted the order of the Jesuits, and assumed the garb of a secular priest, or abbé. He died at Milan in 1756.

QUADRU'MANA, Cuvier's second order of the class mammalia; that termed *Bimana*, including only one species, Man, being the first. It is among the *Quadrumana* that certain forms are found which approximate to Man, however remotely. We allude to the Chimpanzee and Orang-Utan.

Cuvier under his order *Quadrumana* comprehends the Apes, the Monkeys of the Old World, the Monkeys of the New World, and the Lemurine tribes of Madagascar, Africa, Ceylon, &c.

The order *Primates* of Linnæus consisted of the genera *Homo*, *Simia*, *Lemur*, and *Vespertilio*; and some writers still in principle adopt his idea, though they employ different terms of nomenclature. Others advance still further, and under the term *Cheiropoda* include *Homo*, the *Simiæ*, the *Lemuridæ*, the New World Monkeys, and the *Didelphidæ*, or Opossums of America, and Phalangers of Australia. [CHEIROPODA; LEMURIDÆ.]

QUÆSTOR (from *quæro*), a name which was common to two distinct classes of officers at Rome, who were only distinguished from each other by different attributes: the name of one class was *Quæstores Parricidii*; that of the other, *Quæstores Classici*.

The origin of the Quæstores Parricidii was traced by some writers to the earliest period of Roman history. Their functions related to the prosecution of persons who were guilty of capital crimes.

The Quæstores Classici had the superintendence of the public treasury, and are said to have been instituted by Valerius Publicola, who gave the right of electing them to the populus. At first there were two; in B.C. 487 there were eight. Under the emperors the number varied. The two Quæstores Urbáni, down to the time of Julius Cæsar, had the administration of the public treasury: they registered the revenue and expenditure of the republic, received the money due to the state, and made the payments which were sanctioned by the senate. The Military Quæstors, who accompanied the consuls to the field, had the charge of the military chest, and the superintendence of pay, provisions, and of the booty acquired in war. They had to give in their accounts to the treasury at Rome. The quæstors, it is said, took their seat in the senate after their year of office was over.

QUA'GLIO, DOMENI'CO, was of a family that has produced several generations of artists, and whose place of origin was Luino or Luvino, near the Lake of Como. Their ancestor, Julio Quaglio, was a fresco-painter of some note. Lorenzo Quaglio, who was born at Luino, July 25, 1730, erected the theatre at Mannheim, and that at Frankfort, besides many other buildings, which are esteemed for their superior taste: he died at Munich, May 7, 1804. This Lorenzo left a son, named Giovanni Maria (born 1772), who was a distinguished architectural and scene painter.

Domenico, the brother of Lorenzo, who was himself an historical painter, had two sons, Julius, an admirable scene-painter at Munich (died Jan. 28, 1800), and an elder son, Joseph (born 1747, died at Munich, Jan. 23, 1828), who was even more eminent than his brother. Joseph had four sons, Angelo, Domenico (the subject of this article), Lorenzo (born Dec. 19, 1793), and Simon (born Oct. 23, 1795). Angelo, who died April 2, 1815, at the age of thirty-seven, was also a scene-painter of extraordinary genius.

Domenico was born at Munich, Jan. 1, 1786. He early distinguished himself in landscape and figure painting, but at length devoted himself to architectural subjects. After having made a tour for the purpose of studying the buildings of the middle ages, he produced his picture of Regensburg cathedral, which was purchased by Maximilian, king of Bavaria, and subsequently many others. Independently of their value as representations of some of the finest productions of German-gothic architecture, his works are marked by striking picturesque effect. Besides his pictures, which are very numerous, he executed many etchings and lithographic views, and among the latter a series of thirty subjects, entitled 'Denkwürdige Gebäude des Deutschen Mittelalters.' In 1829 he accompanied Mr. Gally Knight in a tour to Italy, as his architectural draftsman. He died at Hohenschwangau, April 9, 1837.

QUAIL. [PERDICIDÆ.]

QUAINI, FRANCESCO, was born in 1611, at Bologna, and studied under Agostino Mitelli, by whose instruction he acquired great skill in perspective and in painting architectural views. The public edifices at Bologna contain several of his works, the most admired of which are in the Sala Farnese in the Palazzo Publico.

QUAINI, LODOVICO, the son of Francesco, was born at Bologna, in 1643. After having acquired the rudiments of the art and a knowledge of perspective from his father, he became a disciple first of Guercino, and afterwards of his relation Carlo Cignani. His improvement was so great, that in a few years he was employed to assist Cignani in the execution of some of his great works.

Quaini also painted many historical subjects from his own compositions, which were entirely finished by himself. In the church of St. Joseph at Bologna there is a picture of the Visitation; in La Carità, the dead Christ supported by the Virgin; and in the church of St. Nicholas the principal altar-piece is by Quaini. He died in 1717.

QUAKERS, the name first given in scorn, and since habitually, to the sect of Christians who call themselves the 'Society of Friends.'

Origin.—The founder, or rather the first member, of this Society was George Fox, who, towards the middle of the 17th century, after long wanderings about the country and much spiritual conflict and inquiry into the merits of the sects then raging against each other in England, separated himself from all, feeling that 'none could speak to his condition.' By degrees his religious opinions assumed a distinct form, and in the year 1647, when he was 23 years of age, he commenced his ministry by preaching at Dukinfield near Manchester. In a short time the number of believers in his doctrines increased; in 1648 large meetings attended his ministry in Nottinghamshire, and, notwithstanding cruel persecution, the Society spread from the poor and uninstructed to many of the more opulent and educated classes.

Tenets.—The Society of Friends have no articles or creed, subscription to which is required of their members. Their principal tenets may however be gathered from the writings of George Fox, William Penn, and Robert Barclay, and their other approved authors, and from the minutes and epistles issued by their yearly meeting in London to the subordinate meetings. That which may be regarded as the doctrine mainly distinguishing them from other Christians, is what they apprehend to be a fuller recognition both of the universality and of the teaching of the Holy Spirit. They believe that the light of the spirit of Christ does in measure enlighten every man that cometh into the world; that the effects of the death of Christ are coextensive with those of Adam's transgression, according to the declaration of the apostle, 'As in Adam all die, even so in Christ shall all be made alive;' and, as a consequence hereof, that even those who have not the outward knowledge of the Gospel history may, by giving heed to their measure of this light, become partakers of that salvation which comes by Jesus Christ. They hold it to be the prerogative of Christ to call and qualify by the Holy Spirit those whom he commissions to declare unto others the way of salvation. As such have freely received the gift of the ministry, so are they freely to give without hire or bargaining, far less to use it as a trade to get money by. Hence they refuse the payment of tithes and all other ecclesiastical imposts. They believe that the true worship of God is offered in the inward and immediate moving and drawing of his own Spirit. Hence they abstain from the use of all prescribed forms of prayer, and refuse to observe appointed days of thanksgiving, or of fasting and humiliation.

Friends deem the taking of all oaths unlawful. They believe too that all wars and fightings are inconsistent with pure Christianity. They believe marriage to be a divine ordinance, but in their marriages they do not use the intervention of a minister, for whose interference they allege that there is no Scripture warrant.

Discipline.—The affairs of the Society are managed by monthly, quarterly, and annual meetings. The latter meeting is held in London on the Wednesday after the third Sunday in May, and remains sitting many days. It receives reports of the state of the particular churches, and it issues to them a general epistle. A similar representative body or yearly meeting of women Friends is held at the same time for the general supervision of the religious state of those of their own sex, but they have no power to make rules for the government of the body. During the intervals of the yearly meeting, the general business of the Society is conducted by a meeting termed the Meeting for Sufferings, which is a

carefully-selected standing committee of the yearly meeting. There is a general fund belonging to the Society, called the national stock; it is formed by the voluntary contributions of members.

QUAKING GRASS is the name given to the various species of graminaceous plants belonging to the genus *Briza* of botanists. They derive their name from their spikelets being always in a state of tremulous motion in consequence of the weakness of the footstalks by which they are supported.

QUALITY (from the Latin *qualis*), in the common acceptation, comprises all attributes that can be given to a thing, with the exception of those of magnitude and quantity, and it matters not whether the attributes are essential to the thing or merely accidental. But in speaking of the qualities of things, we chiefly consider those by which they are distinct from other and similar things. Among the ten categories or fundamental notions of the philosophy of Aristotle, quality is the third. [CATEGORY.]

QUAMOCLIT, a genus of climbing ornamental plants of the natural family of *Convolvulaceæ*, chiefly found in the hot parts of America, but species are indigenous both in India and China. *Q. vulgaris* is common in every part of India, and, being a beautiful plant, has been cultivated in this country as a tender annual.

QUANTITY. [MAGNITUDE.]

QUANTITY OF MATTER. [MASS.]

QUANTITY OF MOTION. [MOMENTUM.]

QUARANTINE. Quarantine regulations are regulations chiefly of a restrictive nature, for the purpose of preventing the communication from one country to another of contagious diseases, by means of men, animals, goods, or letters. The term Quarantine originally signified a period of forty days, during which a person was subject to the regulations in question.

Quarantine regulations consist in the interruption of intercourse with the country in which a contagious disease is supposed to prevail, and in the employment of certain precautionary measures respecting men, animals, goods, and letters, coming from or otherwise communicating with it. Men and animals are subjected to a probationary confinement, and goods and letters to a process of depuration, in order to ascertain that the contagious poison is not latent in the former; and to expel it, if it be present, in the latter. Quarantine regulations respecting *men* and *animals* are therefore founded on the assumption that the contagious poison, after having been taken into the constitution of a man or an animal, may remain dormant in it for a certain time, and that a seclusion of a certain duration is necessary in order to allow the disease time to show itself, or to afford a certainty that the disease is not latent. Quarantine regulations respecting *goods* and *letters* are founded on the assumption that the contagious poison may be contained in goods and letters, and transmitted from them so as to communicate the disease to men.

The country from which the introduction of a contagious disease is apprehended may either be conterminous with the country which establishes the quarantine regulations, or may be divided from it by the sea. Accordingly quarantine lines may either be drawn round a coast, as is the case in France, Italy, and Greece, with respect to the Levant, or they may be drawn along a land frontier, as on the frontier between Austria and Servia and Wallachia.

The contagious diseases which quarantine regulations are intended to guard against are plague and yellow-fever, and latterly cholera. The principal disease, with reference to quarantine regulations, is the Plague of the Levant; and in practice quarantine regulations are of little importance except with respect to the intercourse by land and sea with Turkey, Asia Minor, and Egypt, and some other of the Mohammedan countries bordering on the Mediterranean.

There seems to be no reasonable doubt that the plague is contagious—in other words, that it can be communicated directly from one person to another—provided there be circumstances favourable to its transmission. A quarantine for persons may therefore be expedient for countries where the spread of the plague, supposing it to be introduced, is not improbable. The duration of this quarantine ought to depend upon the time during which the disease may be latent in a person who has taken it by contagion or otherwise.

It is commonly assumed that actual or nearly actual contact is necessary in order to communicate the plague. But we believe the idea that actual contact is necessary for the communication of the plague, to be erroneous. Under circumstances favourable to its communication, such as filth, crowding, and want of ventilation, the poison of the plague may be introduced into the human body by inspiration through the lungs. The escape of the physicians, guardians, and others, who come within a short distance of the plague-patients in lazarettoes, is explained by the circumstance that, with the isolation, cleanliness, and good ventilation of a well-managed lazaretto, the contagion of the plague is exceedingly feeble.

According to the belief commonly received in the Mediterranean, all living animals are capable of communicating the plague. Accordingly, horses, asses, cattle, and sheep, are placed in quarantine upon their importation. But we suspect that there is no foundation for the notion that plague can be communicated by means of animals.

Goods carried in ships or by land are subject to quarantine, according as they belong to the class of susceptible or non-susceptible goods. Goods which are supposed to be capable of containing and transmitting the poison of the plague, are called *susceptible*. Goods which are supposed to be incapable of containing and transmitting the poison of the plague, are called *non-susceptible*. All animal substances, such as wool, silk, and leather, and many vegetable substances, such as cotton, linen, and paper, are deemed susceptible. On the other hand, wood, metal, and fruits, are deemed non-susceptible.

The grounds of the received distinction between susceptible and non-susceptible articles appear altogether fanciful; for we cannot discover any evidence that the plague has ever been communi-

cated by merchandise. Whenever the plague has been introduced into the lazarettoes of the Mediterranean, it has always been introduced by passengers or their clothes. There appears to be conclusive evidence that the clothes and bedding of plague-patients have transmitted the plague. We believe the danger of its transmission in this manner to be equal to the danger of its transmission by passengers.

We are not aware of any well-authenticated example of the transmission of the plague by letters. Nevertheless, as paper is considered susceptible, letters coming from and passing through the plague countries are opened and fumigated at the lazarettoes.

Every ship is furnished by the consul or other sanitary authority at the last port where it touched, with an instrument styled a Bill of Health, declaring the state of health in that country. If the ship brings a clean bill of health, the passengers and goods are not subject to any quarantine. If she brings a foul bill, they are subject to quarantines of different durations, according as the plague is known or only suspected to have existed in the country at the ship's departure. On account of the prevalence of plague in the countries upon the Levant, they are considered as permanently in a state of suspicion, and no ship sailing from any of them is considered to bring a clean bill. The periods of quarantine vary from two or three to forty days; the usual periods are from ten to twenty days.

The building in which passengers usually perform their quarantine, and in which goods are depurated, is called a Lazaretto. The most spacious and best appointed lazarettoes in the Mediterranean are those at Malta and Marseille.

The heads of the English law respecting quarantine are contained in the 6 Geo. IV. c. 78. This Act also confers upon the queen in council extensive powers for making quarantine regulations.

QUARE IMPEDIT. When an ecclesiastical benefice becomes vacant by the death, cession, &c. of the incumbent, unless the patron [ADVOWSON] present his clerk, that is, a clergyman, to the bishop of the diocese for institution, within six calendar months, the right will lapse to the bishop, who may collate to the vacant benefice. But if a presentation be made by the patron within the six months, and it is rendered ineffectual by the bishop's refusal to institute the clerk, the patron may obtain redress in an action of Quare impedit, a proceeding so called because the writ by which the action is commenced requires the defendant to state Quare impedit (why he hinders) the plaintiff from exercising his right of presenting to the vacant benefice. If the bishop be the sole disturber of the right, as is the case when he rejects the clerk upon an unfounded allegation of personal incapacity, as illiterature, immorality, &c., the action of Quare impedit is brought against the bishop alone. The 3 & 4 Wm. IV. c. 27, s. 3, limits the period within which a Quare impedit can be brought. If the bishop has instituted a clerk upon the presentation of a party wrongfully claiming to be patron, the action is usually brought against the bishop, the patron so claiming, and his clerk jointly; for unless the bishop be made a party to the suit, a title to present by lapse will accrue to him if the suit remain undetermined at the end of six calendar months from the death, &c. of the last incumbent, and the benefice remain vacant, and the clerk instituted is, in consequence of the want of title in his patron, shown to be an intruder. If the patron be omitted, the proceeding is void, inasmuch as the validity of the title under which he has presented, as opposed to that set up by the plaintiff, is the subject to be inquired into. If the clerk be omitted, there can be no process (in a suit to which he is no party) to remove him from the benefice in case he has been instituted, and is ultimately found to have been presented on an insufficient title; and the consequence will be that the plaintiff must lose his right of presenting to the benefice for the present turn.

The patron only, and not the clerk, can maintain an action against the disturber. But under several statutes passed in the reigns of James I., William and Mary, and Anne, which took away the right of presentation from Roman Catholic patrons, the clerks presented are empowered to take certain proceedings in support of their interests. The right of presenting to benefices belonging to Roman Catholic patrons is vested by those statutes in the universities of Oxford and Cambridge, according to a distribution of counties given in the act of James I. The 12 Anne, st. ii., c. 14, provides (s. 4) that besides the writs of Quare impedit which the universities as patrons are entitled to bring, they or their clerks may file a bill in equity against any person presenting to such livings and disturbing their right of patronage, in order to compel a discovery of any secret trusts for the benefit of Roman Catholics in evasion of these statutes: and also (by 11 Geo. II., c. 17) to compel a discovery whether grants or conveyances of such advowsons were made bonâ fide to a Protestant purchaser for the benefit of Protestants and for a full consideration; without which requisites every such grant and conveyance of any advowson is declared to be void. This is the only case in which the clerk is at liberty to interfere with the recovery of a presentation of which he is afterwards to have the advantage.

The statutes which give to the universities the right to present to benefices belonging to Roman Catholic patrons do not affect patrons who are dissenters, Jews, or pagans, all of whom may exercise this right. When the disability was first created, persons professing the Roman Catholic religion were the only class from whom any danger in a political or religious point of view was apprehended; and the circumstance that persons who have been admitted to holy orders in the Church of Rome are capable of holding benefices in the Church of England, may perhaps have increased the jealousy with which Roman Catholic patrons were regarded by the legislature.

These statutes do not transfer any right of presentation to the universities, if the patronage of a vacant benefice is vested in several parties,

unless all of them profess the Roman Catholic religion. If there be two patrons, one a Protestant and the other a Roman Catholic, the right of presentation vests in the former. (6 Bingham's 'New Cases,' 146.)

QUARENGHI, GIACOMO, was born at Bergamo, Sept. 20, 1744, and was sent to pursue his studies at Rome, where he became a pupil of Mengs and Stefano Pozzi. But he subsequently abandoned painting for architecture. According to the biographical memoir by his son Giulio, prefixed to the folio volume of his designs (entitled 'Fabbriche e Disegni,' &c., Milano, 1821), he soon became known in his profession, and obtained many commissions while he continued at Rome, but none of them are further specified; neither is the precise time stated when he left Italy for St. Petersburg, whither he had been expressly invited by the empress Catharine II. At St. Petersburg, among his principal works are the Theatre of the Hermitage, the manège or riding-house of the imperial guards in the Isaac's Place, the convent of Demoiselles Nobles, Prince Gagarin's palace, and the triumphal arch in honour of the Emperor Alexander, designed by Quarenghi, but not executed in stone till after his death, which occurred in 1817.

QUARLES, FRANCIS, was born in 1592, of a good family in Essex, educated at Christ College, Cambridge, and entered at Lincoln's Inn. In 1641 he was Usher's secretary, but the Irish rebellion forced him to fly to England, where he was persecuted for his attachment to King Charles. He died Sept. 8, 1644.

His works are now neglected, with one exception, that of his 'Emblems,' which have been many times reprinted, and are sought after by some for their quaintness, by others for their piety. Quarles had eighteen children, of whom one inherited somewhat of his father's poetical genius, shared the royal fortunes, and died of the plague in 1665.

QUART, the same word as quarter, but always used (in our language) for the quarter of a gallon. [GALLON.]

QUARTER, the fourth part of anything. The frequency of division into four parts has caused the word to be used sometimes in the sense of a part or portion allotted. Thus the portion of a camp or barrack allotted to one soldier is called his *quarters*.

QUARTZ, the mineralogical name of numerous varieties of rock crystal, the native oxide of silicium [SILICIUM], called also siliceous or flint earth, and silicic acid.

Quartz occurs crystallised and massive, and in both states it is widely diffused throughout nature, and is especially one of the constituents of granitic and the older rocks. Quartz is hard enough to strike fire with steel; it becomes luminous and electrical by friction; it is of various colours; it is infusible; insoluble in acids, in general, but acted on by hydrofluoric acid.

Hornstone and *Chert* are varieties of compact quartz. Cavernous quartz is termed *Spongiform Quartz* or *Swimming Stone*.

Among the numerous varieties of quartz are *Brown* or *Smoky Quartz*, *Purple Quartz*, or *Amethyst*, *Blue Quartz*, *Green Quartz*, *Yellow Quartz*, and *Red Quartz*. Among the minerals in which quartz is the chief ingredient, are *Agate*, *Avanturine*, *Flint*, *Flinty Slate*, *Opal*, *Chalcedony*, *Heliotrope*, *Onyx*, *Plasma*, *Sard*, *Sardonyx*, and *Jasper*. Most of these are described under their respective names.

It is well known that siliceous earth assumes other forms besides that of quartz and the varieties of it which have now been mentioned; one of the most useful of these is common sand. [SILICIUM.]

QUA'SSIA (a name formed in remembrance of a negro named Quassy, who first made known the medicinal virtues of one of the species) is a genus of plants belonging to the *Simarubaceous* order. It consists of trees inhabiting the tropical parts of South America, particularly Surinam and the adjoining countries.

Quassia amara, the true Quassia of modern botanists, is a small tree inhabiting the woods of Surinam, Demerara, and probably the greater part of Central America. The wood of the root of this plant was formerly in great repute as a stomachic and as a remedy for the malignant endemic fevers of Surinam. The flowers also were and still are, in that country, infused in wine or spirits, and form a bitter beverage, but the wood is out of use, in consequence partly of its being less easily procured than that of the next species, and partly from an opinion being entertained of some bad properties existing in connection with the intense bitter.

Quassia excelsa, the *Picræna excelsa* of Lindley, is a large tree inhabiting Jamaica. The wood is white, and scentless, but most intensely bitter. It is one of the ingredients employed by fraudulent brewers in adulterating beer.

Quassia Simaruba is the plant which furnishes the bark called Simarouba, which comes from Jamaica in bales, and is used as a tonic, although it also appears to act as an emetic. It is a large tree, found in the West India Islands and on the mainland of America.

Quassia is imported in billets, sometimes a foot in diameter and several feet long; but before being used for medicinal purposes, they are cut into chips, which are of a light gray colour, or, by long exposure to the air, of a yellow or brownish hue. The active principle of Quassia seems to be *quassite*, a neutral substance, which crystallises in white prisms, and is readily soluble in alcohol.

QUASSIN, a neutral substance contained in the *Quassia amara* and *Quassia excelsa*. It crystallises in small white prisms, which are very bitter, and do not alter by exposure to the air.

Quassin dissolves readily in alcohol and in æther. Concentrated sulphuric acid and nitric acid of 1.25 dissolve it without acquiring colour. Quassin consists of—carbon 66.77, oxygen 26.32, hydrogen 6.91=C^{20} O^{6} H^{12}.

QUATRE VALLÉES, a district in the department of Hautes-Pyrénées, comprehending *the four valleys* of Aure, Barousse, Magnoac, and Neste. The air of the district is cold but healthy; the land yields pasture and good timber. Castelnau de Magnoac was the chief town.

QUEBEC, the chief city of East Canada, is situated on the river St. Lawrence, about 400 miles from its mouth, in 46° 49′ N. lat. and 71° 12′ W. long. It was built by the French in 1608, and has belonged to the English since Wolfe's victory in 1759. Quebec is situated on a promontory formed by the confluence of the river St. Charles with the St. Lawrence, at the north-east extremity of an elevated but narrow table-land, which for about eight miles forms the left bank of the St. Lawrence. Cape Diamond presents a nearly precipitous face to the St. Lawrence; the descent to the St. Charles is more gradual. The height of the platform of the citadel of Quebec, which stands on Cape Diamond, is 333 feet 3 inches above the St. Lawrence. Quebec is divided into the Upper and Lower Towns. The Lower Town, which is the seat of commerce, is built round the base of the promontory, where in many places the rock has been removed to make way for the houses, which are ill built and irregular, and the streets narrow and badly paved. The ascent to the upper town is either by a narrow and steep winding street, or by a flight of steps. The upper town has a northerly aspect, and is well ventilated; the streets are rather narrow, but tolerably well paved. All public buildings and many private houses are roofed with tin-plates, which retain their brightness many years, and produce a very striking effect. The citadel which crowns the summit of Cape Diamond is strongly fortified, and covers about 40 acres of ground. A wall, mounted with heavy ordnance, surrounds the upper town, which has five gates strongly defended. The Protestant cathedral is a plain modern edifice with a spire; the court-house is close to it. The other chief buildings are the parliament house, the Catholic cathedral, the Jesuits' college (now a barrack), and three nunneries. There are churches and chapels for various religious bodies, and several educational, literary, and benevolent institutions. The winter lasts from November to May; during December, January, and February, the thermometer usually ranges from freezing-point to −25° Fahr. The river is frozen across at Quebec about once in ten years. During summer the range of the thermometer is from 60° to 90°, and the mean of the summer is about 68°. The population in 1759 was 8000 or 9000; in 1825, 20,396; in 1843, 36,173. Quebec gives title to a Protestant and to a Catholic bishop. The number of vessels that arrived from sea, while the navigation was open in 1848, was 1901 (409,760 tons), besides 71 from lower ports (4404 tons); and in 1849, 1949 (423,605 tons), and 89 from lower ports (5964 tons). Great numbers of British emigrants land yearly at Quebec. Quebec suffered severely from three extensive fires in 1845-6, by which more than 3000 houses were burnt. Since the union of the Canadian provinces, in 1840, Quebec has suffered in its political importance; and the late transfer of the seat of government, from Montreal to Toronto, will probably still more diminish its importance. A railroad is now (Jan. 1850) in course of construction from Quebec to Melbourne.

QUEDLINBURG. [MAGDEBURG.]

QUEEN, the Saxon *Cwen*, which was used to denote *mulier, femina, conjux*, as well as women of the highest rank. The use of it to denote a princess who reigns in her own right, and possesses all the powers which belong to a male person who has succeeded to the kingly power in a state, is a modern application of the term.

In England the king's wife has some peculiar legal rights. She can purchase lands and take grants from the king her husband; she has separate courts and officers, including an attorney-general and a solicitor-general; she may sue and be sued apart from her husband, have separate goods, and dispose of them by will. She pays no toll, is not subject to amercement, has a share in fines made to the king for certain privileges, which last is called queen's gold. Anciently manors belonging to the crown were assigned to her in dower, but now the provision for her is made by a parliamentary grant. It is treason to compass or imagine the death of the king's wife. To violate or defile her person is also treason, though she consent; and if she do consent, she also is guilty of treason. It has been the usual practice to crown the queen with the same kind of solemnities as are used at the coronation of a king.

If a queen dowager marry a commoner she does not lose her rank; but no one, it is said, can marry a queen dowager without special licence from the king.

A queen regnant, or princess who has inherited the kingly power, differs in no respect from a king. [KING.]

QUEEN CHARLOTTE'S ISLANDS, also called the Archipelago of Santa Cruz, are a group of islands in the Pacific, north of the New Hebrides, between 10° and 12° S. lat. and 165° and 168° E. long. These islands were discovered in 1595 by Mandana, but were not visited until Carteret found them again in 1767. The archipelago consists of five or six islands of moderate extent, and a great number of smaller ones. Some of these islands are surrounded by extensive coral-reefs. The largest is the island of Santa Cruz, which is above 20 miles long from E. to W., and about half a mile wide. The other islands are Guerta, Tubua, Lord Howe, Mallicolo, and Volcano: the last has an active volcano. The larger islands and some of the smaller are elevated, and apparently of volcanic origin. They are well wooded, and very populous. They produce the cocoa-nut, the bread-fruit, and all the products of the Friendly Islands and New Hebrides. The inhabitants belong to the race of the Austral negroes. It was on the island of Mallicolo that La Perouse was wrecked and lost with his crew. [PEROUSE.]

QUEEN'S COLLEGE, Cambridge, was founded by Margaret of Anjou, consort of King Henry VI., in 1446; and re-founded by Elizabeth Woodville, consort of King Edward IV., in 1465.

There are 19 Foundation Fellowships in this college entirely unrestricted. A bye-fellowship was founded in 1694 by D. Edwards. This fellowship is perfectly open, may be held by a layman, and is tenable with any property or preferment, except ecclesiastical to a certain amount.

The Scholarships of this college, which were consolidated some years ago, have been again consolidated and augmented by college grants; and it has been agreed by the President and Fellows that there shall in future be 15 Scholarships tenable till B.A., two of which shall be of 50*l.* a year, two of 40*l.*, and eleven of 15*l.*

The number of members on the books in 1848 was 329.

Queen's College is situated to the west of Catherine Hall, on the banks of the river Cam, and consists of two courts, built of brick. The chapel has been modernised.

QUEEN'S COLLEGE, Oxford, was founded in 1340, by Robert Egglesfield, rector of Brough, in Westmoreland, and confessor to Philippa, queen of Edward III. (from whom it is called Queen's College) for a Provost and 12 Fellows (since increased to 16), to be chosen from the counties of Cumberland and Westmoreland. The founder himself was a native of Cumberland. Eight Fellowships and 4 Scholarships, open to natives of any county or place, and 4 Exhibitions confined to the province of Canterbury, have been since founded in this college, in pursuance of the will of John Michel, Esq., of Richmond, in Surrey. There are several other exhibitions.

The present buildings of this college consist of two spacious courts, divided by the hall and chapel, and compose an oblong of 300 feet in length and 220 in breadth.

The foundation stone of the first or south quadrangle was laid by Dr. William Lancaster, then provost, on February 6, 1710; but it was not finished till 1759. In 1733 Queen Caroline gave 1000*l.* towards completing this quadrangle: the design is attributed both to Hawksmoor and Wren. [HAWKSMOOR.] Over the gate of entrance from the High Street, on the south side, is a statue of Queen Caroline, under a cupola supported by pillars.

The library, on the west side of the north court, was begun in 1692, and the outside finished in 1694. The present chapel was dedicated on All Saints' Day, 1719.

The number of members upon the books of this college in Jan. 1848 was 271.

QUEEN'S COUNTY, a county of the province of Leinster in Ireland, is bounded N.W. and N. by King's County, E. by Kildare and a detached portion of King's County, S.E. by the county of Carlow, S. by that of Kilkenny, and S.W. by that of Tipperary. This county is comprehended between 52° 45′ and 53° 13′ N. lat., and 6° 54′ and 7° 47′ W. long. Its greatest length E. by S. to W. by N. is 37 miles: its greatest breadth, at right angles to the length, is 33 miles. The area is 664 square miles. The population in 1841 was 153,930.

Surface, Geological Character, and Hydrography.—Two principal groups of hills traverse the county. The Slievh Bloom, or Bloom Mountains (part of the range of highlands which separates the basin of the Shannon from the basins of the Barrow and the Suir), occupy the north-western part of the county, and in one part separate it from King's County. The Dysart Hills occupy the south-eastern part of the county, and separate the valley of the Barrow from that of its tributary the Nore. They are situated in the best-wooded part of the county. They do not form a continuous ridge, but consist chiefly of isolated hills. The rest of the county is flat, or varied only by gentle undulations.

The greater part of the county is included in the limestone district, which overspreads so large a part of Ireland. The Slievh Bloom are composed chiefly of sandstone, and a portion of the Dysart Hills is formed by the anthracite coal-measures. The coal-field extends from this county into the adjacent county of Kilkenny, and there are several coal-pits in each. Iron, copper, and manganese are found, but not worked. Limestone is quarried in almost every part, and marble in a few places.

The county is for the most part comprehended in the basin of the Barrow; but a small portion on the north and a yet smaller portion on the west side belong to the basin of the Shannon. [BARROW; SHANNON.] The Nore does not fall into the Barrow till long after it has quitted this county: it rises in the adjacent county of Tipperary, and enters Queen's County on the S.W., and flows N.E. and E. to Castletown. Below Castletown it turns to the S.E. and flows to the border of the county, which, before finally quitting it, it separates for a short distance from Kilkenny county. That part of its course which belongs to this county may be estimated at 28 miles. It receives the Tonnet and several other small tributaries on the left bank.

The Lower or Little Brosna, or Brusna, which joins the Shannon below Banagher, rises just within the western boundary of the county; and the Clodagh, whose waters fall into the Brosna, which also joins the Shannon above Banagher, rises within the northern boundary.

The only lake is Lough Annagh, on the northern border of the county; it does not exceed a mile in length. Bogs are numerous in the central part of the county, between the Slievh Bloom and the Dysart Hills.

A branch of the Grand Canal enters the county at Monasterevan, at its north-eastern corner, and there divides into two branches, one of which runs westward about 12 miles to Mount Mellick; the other, known as the Athy Canal, runs 12 miles southward to Athy, just below which town it joins the Barrow: this latter branch is partly in Kildare county.

The Great Southern and Western Railway passes through the county.

Soil and Agriculture.—Almost every kind of soil is found in the county, from a very stiff clay to a very light sandy but fertile loam. There are extensive tracts of bog, and a good deal of cold wet ground, especially near the mountains. Considerable part of the waste land might be reclaimed with great advantage; but the poverty of the tenantry, and the absence of any material assistance from the landlords, prevent this improvement. The same causes prevent also the draining of a considerable quantity of land which, though under cultivation, is comparatively unpro-

ductive for want of this improvement, as well as the building of farm-houses and other erections, and making fences and roads, the cost of which is generally left to the tenant.

The prevalent rotation of crops is, on the larger farms, as follows:—first year, potatoes with manure; second, wheat or barley; and third, oats; some persons then lay down the land to grass from two to five years. The small holders know little of rotation of crops; they raise potatoes and corn, either wheat, barley, or oats, alternately. The only artificial grasses cultivated by the small holders are clover and seeds. Some of the larger farmers grow clover, a few vetches, rye-grass, and trefoil: turnips and mangel-wurzel are grown, though not to a great extent, by some of the gentry and large farmers. The cultivation of potatoes has increased: peat or bog-stuff is commonly used as manure. The harvest is generally got in with care, except that the barley, and sometimes the other crops, are cut late, so as to occasion loss from shedding. Grazing-farms are not numerous, and are generally occupied by gentlemen farmers.

Divisions and Towns.—Queen's County is divided into 9 baronies. It is in the united diocese of Ossory, Ferns, and Leighlin. It is in the Home Circuit, and the assizes are held at Maryborough. The county returns two members to Parliament, and the borough of Portarlington one member.

The following are the principal towns, with the population of each in 1841:—*Abbeyleix*, 9 miles S.S.W. from Maryborough, is remarkable for little else than a handsome church—a modern gothic building. Population of the town, 1021. *Ballinakill* is 13 miles S. by E. from Maryborough. It is in a declining condition. The woollen manufacture, for which it was formerly so famous, is still carried on to a limited extent. Population of the town, 1540. *Ballyroan* is about 10 miles S. from Maryborough. *Graigue* is a suburb of the town of Carlow, with which it is connected by a bridge over the Barrow. The parish church is a handsome building, and there is a very large Roman Catholic chapel. Population of the town, 1675. *Maryborough* is the chief town, and a municipal borough. It is 9¼ miles S.S.W. from Portarlington, by the Great Southern and Western Railway. Being the assize town, it contains the county court-house, gaol, and infirmary. There are also a neat church, Roman Catholic chapel, Methodist and Independent meeting-houses, and a district lunatic asylum. Though a place of importance in former days, it has but little trade at present. The streets are narrow and inconvenient. Population of the town, 3633. *Mountmellick* is on the Owenas, one of the feeders of the Barrow, 7 miles N. by W. from Maryborough. It is a neatly-built and thriving town, perhaps the most prosperous in the county. A branch of the Grand Canal from Monasterevan, which passes close to Portarlington, extends to Mountmellick, and along this branch a considerable quantity of goods and country produce are carried. A settlement of Quakers has long existed here, who carry on cotton spinning and various branches of trade, and maintain a large school for the education of poor children. The town, besides the usual places of worship, contains a court-house, a branch of the Bank of Ireland, a union-workhouse, &c. Population of the town, 4755. *Mountrath* is 9¼ miles W.S.W. from Maryborough, by the Great Southern and Western Railway. There is a little trade carried on in the manufacture of cotton and worsteds; and a good deal in the sale of the agricultural produce of the surrounding country. The town is considerable in extent, and, from its central situation, well adapted for inland trade. Population of the town, 3000. *Portarlington*, a parliamentary borough, is 9¼ miles N.N.E. from Maryborough, by the Great Southern and Western Railway. It is situated on the Barrow, by which it is divided into two unequal parts; the larger portion, on the right bank, is in the Queen's County; the other, on the left bank, in the King's County. The town consists principally of one main street, nearly a mile in length; the houses are generally large, regularly built, and respectably inhabited; but the town possesses neither trade nor commere. The degree of prosperity which it enjoys may therefore be ascribed to the number of its resident gentry. It has also a well-established reputation for the goodness of its schools. There are two Protestant churches, a Methodist and Roman Catholic Chapel, a court-house, hospital, dispensary, &c. The borough, which returns one member to Parliament, is comprehended in precisely the same limits as the town: population, 3106. *Rathdowney*, 19 miles S.W. from Maryborough, is a small and neglected place, remarkable only for some ancient remains in the neighbourhood. Population of the town, 1414. *Stradbally*, 7 miles E. from Maryborough, is a well-built little town, situated on a feeder of the Barrow, over which there is a bridge of three arches. It has great advantages of position, and promises to be flourishing and important. There is a church—a handsome building—and a large Catholic chapel. Population of the town, 1685.

History.—Of the inhabitants of this county, in the earliest period of Irish history, nothing certain is known. At a later period the county was comprehended in the districts of Leix and Ossory, which appear to have maintained a state of precarious independence from the reign of Edward II. to that of Henry VIII. But on the death of the last-named monarch, the O'Mores, who held the district of Leix, having rebelled in conjunction with the O'Connors of Ofally (now King's County), were defeated by Sir Edward Bellingham, the Lord Deputy, who sent their chiefs prisoners to London (where O'More died), and reannexed their territories to the English pale. The county was the scene of some severe contests during the rebellion which commenced in 1641; and again during the war which followed the revolution of 1688.

QUEEN'S LETTER. [Brief.]

QUEENBOROUGH. [Kent.]

QUEENSFERRY. [Linlithgowshire.]

QUENTIN, ST. [Aisne.]

QUERCIN, a neutral crystalline substance

procured from the bark of the oak. It forms small colourless crystals, which are inodorous, and have a very bitter taste; they are very soluble in water, 100 parts at 66°. taking up 7.3 parts: at a higher temperature a greater quantity is dissolved. The solution has no action either on litmus or tumeric paper. Quercin is soluble in weak alcohol, but not in absolute alcohol, æther, or oil of turpentine. It dissolves in various acids, but does not appear to combine with them. The solution of pure quercin is not affected by carbonate of potash, acetate of lead, nitrate of silver, protonitrate of mercury, or solution of gelatin.

QUERCITRIN, the name given by Chevreul to the colouring principle of the Quercitron Bark. It crystallises in colourless acicular crystals, which have at first a slightly sweet taste, and subsequently a bitter one. They are very soluble in water, in alcohol, and in æther. On boiling a solution of Quercitrin, it becomes turbid, and deposits a quantity of small acicular crystals of *Quercitrein*, less soluble in water, and which forms with hydrate of lead a beautiful yellow lake of lead. It appears from analysis that *Quercitrin* is converted into *Quercitrein* by absorbing four equivalents of oxygen. The formula representing *Quercitrin* is C^{32} H^{15} O^{14}, and *Quercitrein* is represented by C^{32} H^{15} O^{18}.

QUERCITRON BARK. [BARK.]

QUERCUS, the Latin word for an Oak Tree, which is of frequent occurrence in the Roman writers. It is now, as then, applied to the oak and all the other species associated with it by botanists in one common genus.

Oaks, like roses, are scarcely known in a wild state in the southern hemisphere. In the islands of the Indian Archipelago they reach their most southern limits, extending as far as Java; thence they pass upwards beyond the equinoctial line, and following the eastern parts of Asia, they spread to the westward along the Himalaya Mountains, and reaching Europe, are only arrested by the Atlantic Ocean. On the other hand they find their way to the eastward of their Asiatic origin, and overrun America from Canada through California and Mexico, till their progress to the south is stopped by the Isthmus of Panama.

The species of oak are extremely numerous; probably not fewer than one hundred and fifty; and, as always occurs in large genera, they are difficult of distinction by unskilful persons. On the present occasion we can pretend to nothing more than a brief account of those species which are best known, or to which it is most essential that attention should be directed. The reader will find a very elaborate account of the genus in Loudon's 'Arboretum Britannicum,' vol. iv., where are wood-cuts of numerous species and an abundance of popular and amusing information.

Although a geographical arrangement of species is not a very scientific mode of treating the subject, we believe it to be the best that we can follow on the present occasion.

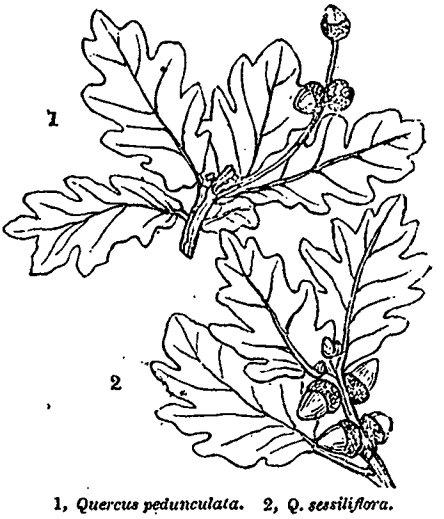
I. *Oaks of Europe, Northern Asia, and Northern Africa.*

Under this head we include all the more common species of the genus, the greater part of which exist in cultivation in this country. They may be divided into three groups: the *Forest Oaks*, or *Robora*; the *European Oaks*, or *Ilices*; and the *Mossy-Cupped Oaks*, or *Cerres*.

The Forest Oaks (*Robora*).

Q. pedunculata, Common British Oak. This species has the reputation of being the true British Oak, whose timber is alone suited for naval purposes on account of its durability and hardness; but this is a mere fable, the wood of the next species being as suitable in all respects under equal circumstances. But the timber of the oak, like all other wood, is materially affected by the nature of the soil in which it grows, and this has probably given rise to the often-repeated assertion that Sussex oak, which chiefly consists of *Q. pedunculata*, is the best kind that can be employed in shipbuilding. The species is readily known by its leaves having very short stalks, or none at all, while the acorns are placed on very long stalks.

Q. sessiliflora, Sessile-Cupped Oak. Experiments as to strength and toughness of the timber of this species have shown that there is no material difference in those respects between it and that of *Q. pedunculata*, and the durability of the wood of the sessile-cupped oak is attested by the fact, that the roof of Westminster Hall is constructed of it, and not of chestnut, as has been sometimes said. *Q. sessiliflora* is found all over England, but nowhere in great quantity. It however is most abundant in the west, and constitutes the greater part of the oak of North Wales. It is a much handsomer tree than the last, and grows considerably faster, and therefore is the most advantageous kind for the planter.



1, *Quercus pedunculata*. 2, *Q. sessiliflora*.

The *Q. fastigiata* of the gardens is a singular variety, with the branches rising close to the stem, like those of a Lombardy poplar.

Q. pubescens, a native of the southern parts of Europe, has most of the characters of *Q. sessiliflora*, but its leaves are smaller, and are often quite

woolly on the under side. It forms a majestic tree, with much the habit of *Q. cerris*.

The *Q. æsculus* of Loudon is, no doubt, the same as the last; but what the plant was to which Linnæus applied the name, and which has been supposed by some to be the Æsculus of Virgil, is altogether doubtful.

The Evergreen Oaks (*Ilices*).

All the European oaks with leaves truly evergreen belong to this section, which however in some respects approaches the mossy-cupped oaks when the latter acquire a semi-European habit.

Q. Ilex, Common Evergreen Oak, or Holm Oak, a most variable plant, common all over the south of Europe, where it may be found with leaves varying from being as prickly as a holly to being as even at the edge as an olive, and from the size of a sloe-leaf to that of a beech-leaf. It loves the neighbourhood of the sea, and in its wild state generally grows singly or in small clusters, not forming forests. Its wood is very hard and heavy, tough, and in all respects of excellent quality, where its weight is not against it. Its acorns are bitter and unfit for food.

Q. ballota, Sweet Acorn Oak. This evergreen oak, says Captain Cooke, is one of the leading vegetable features of nearly all Spain. The native woods are formed of it in a great measure. As a species, it is quite distinct from the *Q. Ilex*. The great and essential difference is in the acorns, which are eatable, and when in perfection are as good as or superior to a chestnut. To give this sweetness they must be kept, as at first they have a considerable taste of tannin, which however disappears in a few days. These are the edible acorns of the ancients.

Q. Suber, Cork-Tree. The Cork-Tree is spread through all the warm parts of Spain, but is most abundant in Catalonia and Valencia, whence the principal exports have been made. In the property of forming a spongy soft substance on its bark, it surpasses all other European trees, and hence is of the greatest value for corks and for similar purposes. The form of the tree is said to be much more beautiful than that of the common evergreen oak, and in the districts suited to it attains a great height. The species bears the climate of London, but acquires little of its natural beauty in this country.

Q. faginea, Beech-Oak, is a native of Portugal, Spain, and Tangiers, and apparently unknown in our gardens.

Q. coccifera, Kermes Oak, a native of the south-eastern parts of Europe, where it forms a small bush, resembling a dwarf holly. It is celebrated as being the haunt of the Kermes insect, which yields so brilliant and permanent a blood-red dye, that the old Flemish tapestries, dyed with it two centuries ago, have lost none of their brilliancy.

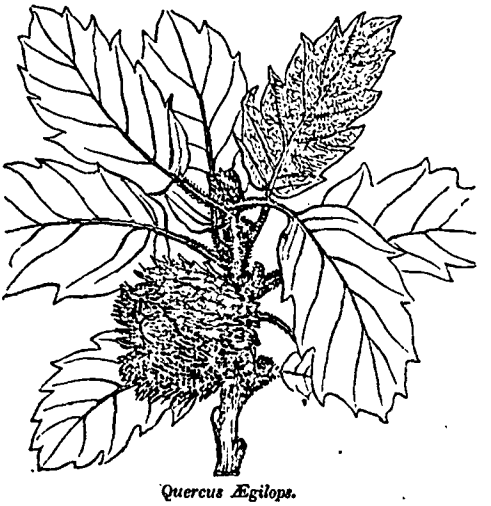
The Mossy-Cupped Oaks (*Cerres*).

Q. Cerris, Turkey Oak, an exceedingly common plant all over the south east of Europe, where it seems to form some of the finest specimens of oak. It has an open, straight, graceful mode of growth, very different from the gnarled and tortuous appearance of native British oaks, than which it also grows much faster. The timber of this oak is beautifully mottled, in consequence of the abundance of its silver grain; and there is reason to believe that it is, under favourable circumstances, equal to that of any other species.

Q. Hispanica, the Spanish Oak. According to Mr. Barker Webb, this plant grows in Spain and by the Algerine River Monchique.

Q. Austriaca, the Austrian Oak. Of this plant, which is found in Austria, Hungary, &c., the leaves are larger and more deeply sinuated than in *Q. Hispanica*, and the acorns are considerably larger; otherwise it is very like that species.

Q. Ægilops, Great Prickly-Cupped Oak, or Valonia. The Morea and adjacent countries produce this valuable tree, which yields the acorns called velani, or valonia, in commerce, of which many tons are imported yearly for the use of tanners. The tree is reported to be handsome in its own country; but with us, although it has long been cultivated, it is an inelegant tree, of a stunted mode of growth.



Quercus Ægilops.

II. *Oaks of the Levant.*

Little has hitherto been ascertained regarding the species of this part of the world. The following are those which are best known:—

Q. crinita, Hairy-Cupped Oak, is described as a large tree yielding excellent timber, employed extensively by the Turks in naval constructions.

Q. infectoria, Oriental Gall-Oak, a very common plant in Asia Minor, where its branches are attacked by an insect, the *Cynips Scriptorum*, which punctures them, and causes the formation of the oak-galls so well known in commerce. It forms a scrubby bush rather than a tree, and is of no value except for its galls.

Q. Brantii, Mr. Brant's Oak. This is described as being a most remarkable tree, the full-grown leaves being six inches long, including the footstalk, and three inches and a half across at the widest part, which is near the base. They

are as downy as those of a young plane-tree. The species appears allied to *Q. ballota*.

Q. regia, the Royal Oak, is a noble species, with leaves as large as those of a Spanish chestnut, and much like them.

Q. mannifera, the Manna Oak, an inhabitant of the Koord Mountains. The Koords obtain a sweet mucilaginous substance from its branches and leaves by steeping them in boiling water at the hottest season of the year, and afterwards evaporating the water.

III. *Oaks of the Himalayas, China, &c.*

Although a great deal of information has been collected by Indian botanists concerning the oaks of the cold provinces of India, China, and Japan, so far as the distinction of species is concerned, yet, as none of them have been yet introduced into general cultivation in Europe, little is known of the uses to which they may be respectively applied.

Q. incana, the Himalayan Ilex, a beautiful tree, very like the evergreen oak of Europe. Its leaves are much more woolly on the under side.

Q. lanata, Woolly-Leaved Nepaul Oak. This is one of the handsomest oaks yet discovered, and it exists in a living state in the gardens of this country, but, as might be expected from its native localities, it is not hardy enough to bear the climate of London without protection.

Q. Chinensis, the Chinese Oak, a beautiful Chinese species, found (by the botanist attached to the Russian mission to Pekin) in mountainous places. It is said to have exactly the habit and appearance of a Spanish chestnut.

IV. *Oaks of North America.*

In general these are cultivated in England, where they are found tolerably hardy. They however evidently suffer from want of summer heat, and are by no means of the same value to us as the species of the continent of Europe.

Q. alba, White Oak, a very fine species, producing sweet acorns and excellent timber, and approaching nearer to the European forms than any other American species. Specimens of it in the American forests are often 70 or 80 feet high.

Q. prinus, Chestnut-Leaved White Oak, is a tree of much beauty, varying considerably according to soil and situation. The wood is porous, and not of very good quality, but the broad bright green foliage is handsome.

Q. coccinea, Scarlet Oak. The middle States of North America abound in this and the following species, which derive their name from their leaves becoming in the autumn of a rich crimson colour. It forms a large and graceful tree, but the head wants massiveness. The wood is of very little value, and perishable; it is only employed for fuel and for staves for casks intended to hold dry goods. It grows fast, and stands the climate of even the colder counties of England.

Q. rubra, Mountain Red Oak, is said by Mr. Loudon to be much like the last species. Its timber is of bad quality.

Q. tinctoria, Dyer's Oak, Black Oak, or Quercitron, a native of Pennsylvania and of the mountains of the Carolinas and Georgia, where it becomes a very large tree, with a bark so dark-coloured as to have gained for it the name of Black Oak. The leaves are large and very handsome, becoming dull red or yellow in the autumn. Its wood is strong, but very coarse. The inner bark abounds in a yellow dye of great brilliancy, which is known in trade under the name of Quercitrin.

Q. virens, Live Oak, a very valuable species, confined to the Southern States of the North-American Union, where it is most abundant upon the shores of creeks and bays. It is also abundant in Texas. The Live Oak yields the best oak of America, the timber being heavy, compact, and fine-grained; and is extensively employed in the American dockyards, although it does not usually acquire a large size.

V. *Oaks of Mexico.*

These are extremely numerous, and must in many cases form highly-ornamental trees. Several species have been introduced by the Horticultural Society, but little is known of their habits.

Q. sideroxyla, the Iron-Wood Oak, found in Mexico, near Guanajuato, and in other places, in dry barren places 6000 or 7000 feet above the sea. It forms a large tree of great beauty. Its timber is very hard, takes a fine polish, and is extremely durable when used under ground or when sunk under water.

Q. macrophylla, Large-Leaved Mexican Oak. This is the finest oak in the world. It inhabits the southern parts of Mexico and Guatemala, and has leaves 12 to 18 inches long, and broad in proportion. Its acorns are as large as French walnuts; they have been received in this country by the Horticultural Society, but unfortunately would not vegetate.

QUERCY, a district in the South of France, which formed part of the old province of Guienne, and is now comprehended in the departments of Lot and Tarn-et-Garonne. It was divided into Haut-Quercy, identical with the bishopric of Cahors, and Bas Quercy, which is in the diocese of Montauban. The territory derived its name from the Cadurci, an ancient Celtic tribe who possessed it.

QUERE'TARO, a town in Mexico, in the state of Queretaro, is situated near 20° 32′ N. lat., 100° 10′ W. long., on the table-land of Anahuac, at an elevation of 6362 feet above the sea. The town with its suburbs contains a population of between 30,000 and 40,000. It is rather a well-built place. The site is not quite level, nor are the streets laid out with much regularity, but they abound with fine buildings, large churches and convents. On the approach of the American army against the city of Mexico in 1848 the Mexican Congress retired to Queretaro, where the peace between the two republics was ratified Sept. 15, 1848.

QUESNOY, LE. [NORD.]

QUETTAH. [AFGHANISTAN.]

QUEVEDO Y VILLEGAS, FRANCISCO GOMEZ DE, an eminent Spanish satirist, was born at Madrid, Sept. 1580. He was sent early

to the university of Alcalá, where he took his degree of doctor in theology at the age of fifteen. Quevedo, though of weak sight and with crooked legs, was a gallant and accomplished man, and mixed much in fashionable society, but in consequence of a duel he was compelled to quit the court, and repair to Naples, where he was received by the Spanish envoy Don Pedro Giron, duke of Osuna, who not only retained him in his service, but procured his pardon at Madrid. Whilst at Naples, Quevedo executed some important commissions with which he was entrusted by the viceroy. On the fall of his patron Quevedo returned to court; but scarcely had he arrived there when he was arrested, and confined for three years to his country-seat, la Torre de Juan Abad, upon the charge of being the author of certain libels on the government. In 1641 he was again arrested on the charge of libel, and cast into prison, where he remained for nearly two years. He died some time after his release, in the town of Villanueva de los Infantes, Sept 8, 1645.

Quevedo was undoubtedly one of the best writers of his age, both in prose and verse; and, with the exception of Cervantes, no Spanish author has ever displayed more originality. His 'Sueños,' or Visions, enjoyed the greatest celebrity.

QUI TAM. In those statutes by which certain acts are prohibited under a penalty, it is usual to encourage the enforcing of the penalty by appointing the whole or some part of it to be paid to the person who shall take the risk and trouble, and incur the odium, of bringing the matter before a court of law. Where the part of the penalty not given to the informer is directed to be paid over to the poor of the parish, or to be applied for other purposes, the informer may, if he think fit, sue in his own name only; but where a part, commonly a moiety, is given to the crown, the proceeding is in the following form: 'A. B., who, as well (qui tam) for our lady the queen as for himself, in this behalf prosecutes, complains,' &c.

When a qui tam or other penal action is commenced, no other person can afterwards sue the defendant in respect of the same offence, whatever the result of the first action may be. It is therefore not unusual for offenders against penal statutes to protect themselves by procuring one of their friends to sue. This however will be of no avail against a subsequent informer suing *bonâ fide*, provided the fraud and collusion in the first action can be shown.

QUIBERON. [Morbihan.]

QUICKSILVER. [Mercury.]

QUIETISM is the name of the doctrine of certain ascetic Christians, who taught that the chief duty of man was to be wrapt up in the continual contemplation and love of God, so as to become totally independent of outward circumstances and of the influence of the senses, and they contended that when a man arrived at this state of perfection, the soul had no further occasion for prayer and other external devotional practices. There have been men so disposed in all ages of Christianity, without forming a sect, and even the Mohammedans and Brahmins have their Quietists; but it was a Spanish priest called Michael Molinos, in the 17th century, who first embodied the principles of Quietism in his works, which were condemned at Rome, where the author was imprisoned and died in 1696. About the same time Madame Guyon, or Guion, in France, showed herself a great advocate of Quietism. The Archbishop of Paris styled the contents of her books 'a monstrous and diabolical system.' Fénélon undertook her defence, and this led to a hot controversy between him and Bossuet, and ended in the condemnation of Fénélon by the Pope in 1699. Madame Guion, who had in the mean time been imprisoned, was at last liberated. She died in 1717.

QUIE'TUS was the son of Macrianus, an officer of distinction in the service of Valerianus. When Valerianus was taken prisoner by the Persians (A.D. 260), the soldiers offered the empire to Macrianus the elder, who refused it on account of his age, but accepted it for his two sons Macrianus the younger and Quietus. In the meantime, Gallienus, the son of Valerianus, had been proclaimed Augustus at Rome; but his authority was not acknowledged beyond the limits of Italy, and numerous usurpers arose in the various provinces of the Empire, who have been styled 'the Thirty Tyrants.' Aureolus, one of them, attacked the two Macriani, father and son, on their march through Thrace, defeated them, and put them to death. Quietus, who was a mere youth, appears to have remained behind in Asia. Being seized by Odenátus, prince of Palmyra, who assumed the command of the Roman armies in the East, he was put to death.

QUILLABŒUF. [Eure.]

QUIMPER. [Finiste're.]

QUIMPERLE'. [Finiste're.]

QUIN, JAMES, was born in King Street, Covent Garden, London, Feb. 24, 1693. He was intended for the bar, and was educated in Dublin. At the age of twenty he came to London, and took chambers in the Temple, but finding his means after his father's death inadequate to his support, he became an actor. He made some sensation in the part of Bajazet, at Covent Garden; and in 1720 made his first great hit in the character of Falstaff. He was considered at the head of his profession till Garrick made his appearance.

Quin died at Bath, Jan. 21, 1766. He was a master of elocution, and was engaged in that capacity to instruct Prince George, afterwards George III.

QUINA or QUINIA, a very important vegetable alkali, contained in the three well-known varieties of Cinchona, or Bark, but principally in the Yellow Bark. This alkali is colourless, inodorous, and extremely bitter. It fuses at about 300° Fahr., and when cold is yellow, translucent, friable, and somewhat like resin. When subjected to a strong heat with access of air, it is totally dissipated, with the formation of the vapour of carbonate of ammonia. Quina consists of H^{12} C^{20} O^{2} N^{1}. The only one of the salts of quina extensively employed is the *Disulphate*, the *Quinæ Disulphas* of the London Pharmacopœia, and the *Quinæ Sulphas* of the Edinburgh. The crystals of this

salt are colourless, acicular, have a pearly lustre, a bitter taste, and effloresce when exposed to the air.

QUINAULT, PHILIPPE, born at Paris in 1635, studied the law, but neglected it for the stage. He wrote several tragedies and comedies, but it is on his operas that his reputation rests. His first opera was written in 1673, and his friend Lulli composed the music for it and others. He is considered the first writer of French operas, as the attempts made before his time by Perrin were below mediocrity. 'Armide' is considered his master-piece. Louis XIV. bestowed on him the order of St. Michael, with a pension of 2000 livres, and the French Academy and the Academy of Inscriptions and Belles-Lettres numbered him among their members. Quinault died in 1688. His dramas have been collected and published, in 5 vols. 12mo., Paris, 1715.

QUINCE. [CYDONIA VULGARIS.]

QUINCTILIA'NUS, MARCUS FA'BIUS. There is sufficient evidence in the works of Quinctilian to prove that he was educated if not born at Rome; and it is certain that he must have lived at Rome at least as early as A.D. 59. Dodwell, in his 'Annales Quintilianei,' maintains that Quinctilian was born at Rome in the beginning of the reign of Claudius, about A.D. 42. Jerome ('Chron. Euseb.') says that Quinctilian was the first rhetorician who received a salary from the fiscus. He practised as an advocate with great reputation, and also taught rhetoric for twenty years. The time of his death is unknown. Juvenal, 'Sat.' vii., 192, speaks of him as having been promoted to the rank of senator.

In the preface to the sixth book of his work on the Instruction of an Orator, Quinctilian laments the death of his wife and two sons, and complains that there was no providence in the government of human affairs. His wife died in her nineteenth year, and his younger son in his fifth, soon after the death of his mother. The elder lived to the age of ten, and died while Quinctilian was engaged in his great work. It appears however that he married again, or that he had a daughter, whom he has not mentioned himself; but she is mentioned in a letter of the Younger Pliny ('Ep.' vi. 32), addressed to Quinctilian. Quinctilian's work on the Education of an Orator, 'Institutio Oratoria,' was written in the reign of Domitian, on whom he lavishes the most extravagant adulation. It is divided into twelve books. The object is not merely to give the chief rules of rhetoric, but also to lay down a course of education for an orator. The preface contains an outline of the whole work. The first book gives us information on the mode in which a Roman youth of the better class was educated. He recommends a public school in preference to home education, as the emulation of public schools is sufficient to counterbalance any disadvantage arising from the number of the boys and the consequent inability of the master to give them his undivided attention, as in the case of a single pupil; and he replies at some length to the objection that public schools are injurious to morals, and maintains that a boy incurs as much danger of having his morals injured at home as at school. He recommends the master however to study well the disposition of each boy, and he strongly disapproves of corporal punishment. At the grammar-school the pupil is to learn the art of speaking correctly, and also to study the ancient authors, beginning first with the poets, and afterwards proceeding to the historians. Before going to the school of the rhetorician, the pupil must acquire a knowledge of music and geometry; and he also recommends him to receive some instruction in pronunciation from the comic actors, and in gesture and attitude from the masters in the Palæstra.

After passing through this course of education, Quinctilian considers the pupil competent to enter the school of the rhetorician, and accordingly in his second book he gives the first elements of the art of rhetoric. The first two books are introductory. In the third, the author commences the principal subject of his work, the art of rhetoric.

The first complete MS. of the 'Institutes,' of Quinctilian was discovered in 1417, by Poggio Bracciolini, in the monastery of St. Gall. On the revival of learning, the 'Institutes' of Quinctilian were studied more than any other Latin author.

There are 'Declamationes' extant which are usually published under the name of Quinctilian. There are nineteen of considerable length, and 154 much shorter. Quinctilian says ('Orat. Inst.' vii. 2, p. 21,) that he only published one oration himself. The authorship of these Declarations is therefore doubtful.

The best edition of the Institutes is by Spalding, Leipzig, 1798-1816, 4 vols. 8vo., to which a volume of notes was added by Zumpt, Leipzig, 1829, 8vo. The best editions of the Institutes and Declamations together are by Burmann, Leyden, 1720, 2 vols. 4to.; and the Bipont, 1782, 4 vols. 8vo.

There is an English translation of the Institutes by Guthrie, London, 1756, 2 vols. 8vo.; and Patsall, London, 1774, 2 vols. 8vo.

QUINCY. [MASSACHUSETTS.]

QUINSY, or *Cynanche* or *Angina*, is an inflammation of the throat.

Cynanche Pharyngea, or inflammation of the mucous membrane lining the back of the mouth and the upper part of the throat, is that which usually exists in a common sore-throat, brought on, as it most frequently is, by a change in the weather, or by sitting in cold or damp air. It is usually a mild disease, and chiefly annoying from its liability to recur on slight occasions.

A common Sore-Throat does not need much treatment. Warmth, gentle purgatives, and sweating medicines, the avoidance of stimulating food, and the inhaling of the vapour of hot water, or hot vinegar and water, or the application of a large poultice round the throat, will usually effect its removal in a few days. Sometimes however the disease is prolonged in a slight but obstinate form, which is commonly called a Relaxed Sore-Throat. For this condition the necessary treatment consists of stimulating gargles, such as hot wine, infusion of Cayenne pepper, very diluted mineral acids, &c., and if the patient be in general ill health, tonics and appropriate alteratives.

In more severe cases of inflammation of the pharynx and adjacent parts, matter sometimes forms either around or near the pharynx, or in the

soft palate or the uvula. Wherever the existence of matter can be determined, it should be immediately let out, as from an abscess in any other part of the body. Sometimes a false membrane is found in a sore-throat, and this form of the disease has been termed *Angina membranacea*, or *Diphtherite*.

A severe form of quinsy is that in which the inflammation and formation of false membranes are accompanied by a low typhoid state, with great prostration of strength, and requiring all the remedies that are used in cases of low typhus fever, in malignant scarlet fever, and other dangerous diseases of the same class. It is this form of disease which is usually called Putrid or Malignant Sore-Throat, and by nosologists *Cynanche* or *Angina Maligna*. It sometimes occurs as an epidemic, and was long regarded as attended by sloughing of the throat, the layers of false membrane being mistaken for the inflamed tissue in a state of gangrene.

Cynanche Tonsillaris, or *Tonsillitis*, is an inflammation entirely or nearly limited to the tonsils. Its symptoms are scarcely distinguishable from those of the common form of the preceding disease, and require to be treated on the same general principles.

The most annoying result of repeated inflammation of the tonsils is, that they become permanently enlarged. In this state, although swallowing is not painful, it is often attended with difficulty, and by the partial closure of the fauces the respiration is always obstructed, and requires an effort for its effectual performance. The best means for the removal of this state are astringent gargles, as those with alum, oak-bark, mineral acids, &c., or the application of nitrate of silver. Iodine also, administered internally and rubbed on the throat, often proves useful; but in many cases nothing will alleviate the condition of the patient but cutting off a portion of each tonsil, so as to reduce them to their natural dimensions.

QUINTIN. [Côtes-du-Nord.]

QUINTUS CA'LABER, a Greek poet, who owes his name of Calaber merely to the circumstance that, towards the close of the 15th century, Cardinal Bessarion discovered his poem in the library of a monastery at Otranto in Calabria. The poet in his own work calls himself a native of Smyrna, and describes himself as having in his youth been a shepherd in the neighbourhood of this city. Hence he is more properly called Quintus Smyrnæus. The original MS. bears only the name of Kointos. The most probable opinion as to his period is, that he lived in the 5th century of our æra, in the reign of the emperor Zeno or Anastasius, and that he was a contemporary of Tryphiodórus and Colúthus, whose poems were contained in the same MS. in which that of Quintus was discovered. In confirmation of this opinion we may refer to lib. xii. 335, &c., where Calchas is represented as foretelling the greatness of Rome, in a manner which can only apply to the latter period of the Roman emperors (comp. vi. 533).

His poem, which is called 'Homeri Paralipómena,' or 'Posthomerica' (for the original MS. has no title), contains in fourteen books those events of the Trojan war which are not described in the Iliad, and it is intended to be a completion and continuation of Homer. The source from which the poet derived his materials are chiefly the so-called cyclic poets. In language he imitated the Homeric poems; but an accumulation of single beauties, and the deficiencies of the work as an artistical whole, betray the age of the author.

The first edition of Quintus, together with Tryphiodórus and Colúthus, was printed at Venice by Aldus about 1505. The best edition of the text is by Tychsen, 1807.

QUINTUS CLAUDIUS, QUADRIGA'RIUS, a Roman historian of the time of Sulla, wrote the 'Annals of Rome,' of which only a few fragments remain, down to the 23rd book, in quotations found in Aulus Gellius, Nonius, Priscianus, and other ancient writers. These fragments were collected and inserted by Antonius Augustinus, bishop of Tarragona, in his 'Fragmenta Historicorum,' Antwerp, 1595. Quintus Claudius was one of the authors whom Livy had before him in compiling his history; and Livy quotes him in his eighth book (chap. 19).

QUINTUS CU'RTIUS RUFUS. Nothing is known from extrinsic evidence of the personal history of Quintus Curtius, or of the time when he lived; nor is there a single passage in his work from which anything can be deduced with certainty. A passage in the tenth book (c. 9) appears to allude to some great calamity that had threatened the Roman state, and which had been averted by the emperor (princeps suus), but the name of the emperor is not stated.

The work of Quintus Curtius is entitled 'De Rebus Alexandri Magni Regis Macedonum,' or the 'Acts of Alexander the Great, King of the Macedonians.' It was originally in ten books, of which the first two are lost; the third book begins with the attack of Alexander on Celænæ. There seems also to be something wanting at the end of the fifth and the beginning of the sixth book; and perhaps there are some omissions in the tenth book also. The supplement to Curtius by Freinshemius, is useful.

Curtius is not a critical historian, and he was very ignorant of geography. His style is clear and easy, though rhetorical and ornate; and if he did belong to a late age, which is doubtful, he wrote better than his contemporaries. The work is much better adapted for elementary instruction than some books which are now used for that purpose. The narration is clear and well connected, and the author keeps close to his subject. One of the best samples of his rhetorical style is the speech of the Scythian ambassadors to Alexander (vii. c. 8).

The edition of S. Pitiscus, Hague, 1708, 8vo., contains the supplement of Freinshemius, and a copious commentary, with maps, plates, synopsis, chronology, and index. The latest English translation was by Digby, London, 1714, 1726, 2 vols. 12mo., revised by Young in 1747.

QUISCALUS. [Sturnidæ.]

QUI'SQUALIS, a genus of plants of the natural family of *Combretaceæ*, which is indi-

genous in Amboyna, Java, and the Malayan peninsula, and extends into India. *Q. Indica* is the most common species. Its fruit is reckoned a vermifuge.

QUITCH. [COUCH-GRASS.]

QUITO, the capital of the republic of Ecuador in South America, is situated in 0° 14′ S. lat. and 81° 50′ W. long., at an elevation of 9534 feet above the level of the sea. This great elevation, and its position near the equator, render the climate very mild all the year round, and it may be compared with our finest spring weather. The temperature of the air at noon generally varies between 60° and 67°, and that of the coldest part of the night between 52° and 56°. A small portion of the town is built on level ground, and the remainder on the declivity of a hill. The plain contains the great square, which is surrounded by public buildings. Four wide but short streets extend from the four angles of the square to the declivities of the hill. The cathedral and the episcopal palace stand opposite to one another, in the great square, the other two sides of which are occupied by the government-palace and the town-hall. The remainder of the town is built on the lower declivities, which are furrowed by numerous ravines, some of which are of considerable depth. This circumstance renders the streets very uneven and irregular. The larger streets are paved, and the others, which are not paved, are almost impassable after rain, which is very frequent. There are some smaller squares, on which the convents are built, among which that of the Franciscans is a vast edifice, which is both magnificent and tasteful. The greater part of the houses are built of bricks dried in the sun; and, in order that they may suffer less from the frequent earthquakes, they are only one story high. The roofs are flat, and are covered with the leaves of the American Aloe (*Agave Americana*). The interior of the houses is very simple, the saloon for receiving visitors being the only one which is ornamented. The population was estimated at 60,000 by Ulloa, above a hundred years ago, but is now reduced to about 40,000. There are some manufactures of cotton, silk, and leather, and silver and gold are worked rather extensively.

QUO WARRANTO is a writ in the nature of a writ of right for the king, and it lies against any person or corporation that has usurped or unjustly claims any public office or other franchise or liberty, or that, having originally had a grant of one, has forfeited it by abuse or neglect. Proceedings under it are prosecuted before the judges of the Court of Queen's Bench, and the defendant is called on to show *by what warrant* (*quo warranto*, whence the name of the writ) he exercises the office, liberty, or franchise in question. The first process against him is by summons. If he fail to appear in the same term in which he is summoned, he loses his franchise. After appearance, he may disclaim any title, either to the whole or part of the franchise; or he may plead in justification, showing by what warrant he has exercised it. To this plea there may be either a demurrer or replication, and subsequent proceedings as in ordinary actions. On disclaimer judgment is immediately given for the crown. In that case, or on judgment for the crown on demurrer, or after trial, the judgment is that the franchise shall be seised into the hands of the crown, or, if the crown cannot have the franchise, that the defendant shall be ousted, that is, ejected. If the judgment be for the defendant, it is that he may enjoy the franchise, &c., saving the right of the king, and this saving applies to all titles except that on which judgment is given. The judgment is conclusive even against the crown. (2 'Inst.' 282; Co., 'Ent.' 527, &c.)

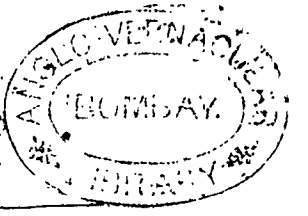
Proceedings under a writ of quo warranto have fallen into disuse, and they have been superseded by informations in the nature of a quo warranto. These informations are adapted to attain the same ends, are applicable to the same circumstances, and are more expeditious, but the judgment under them is not conclusive against the crown. Except when exhibited by the attorney-general, they are filed by leave of the court. The statute of the 9 Anne, c. 20, was passed for the purpose of regulating and expediting the proceedings under an information of quo warranto, relating to the title to corporate offices the due discharge of which affects the prerogatives of the crown or the interests of the public. Although criminal in their title and form, and having for their ostensible object the punishment by fine, as well as the ejection of a party from his office, these proceedings are virtually of a civil nature; and they are now almost exclusively employed for the decision of questions relative to the exercise of corporate rights between mere individuals. By 33 Geo. III., c. 58, the defendant in a quo warranto information against a corporate officer may plead that he exercised the office for six years before the exhibition of the information. By 1 Vict. c. 78, s. 23, the time within which proceedings of quo warranto may be brought against any mayor, alderman, councillor, or burgess, is further limited to one year after either his election to office or the commencement of his disqualification.

QUORRA. [NIGER.]

QUORUM. [SESSIONS.]

QUOTIENT, or QUOTE, the result of dividing one number by another.

END OF VOL. IX.



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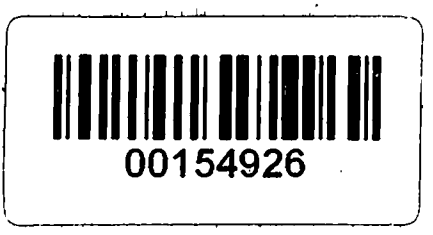
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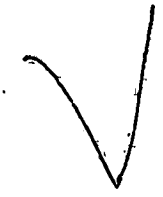

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